

FACTORS AFFECTING PARTICIPATION BEHAVIORS OF PREGNANT  
WOMEN WHO JOINTLY RECEIVED TWO DIFFERENT NUTRITION  
SUPPLEMENTS IN BANGLADESH

A Dissertation

Presented to the Faculty of the Graduate School  
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of  
Doctor of Philosophy

by

JISUNG WOO  
January 2017

© 2017 JISUNG WOO

# **ABSTRACT**

## **FACTORS AFFECTING PARTICIPATION BEHAVIORS OF PREGNANT WOMEN WHO JOINTLY RECEIVED TWO DIFFERENT NUTRITION SUPPLEMENTS IN BANGLADESH**

Jisung Woo, Ph. D.

Cornell University 2017

Low participation in nutrition supplementation can cause the true effects of the supplements to be underestimated. Participation behaviors and their associations with personal and socio-cultural characteristics were examined qualitatively and quantitatively when food and micronutrient supplements were provided jointly to pregnant women in rural Bangladesh to find ways to improve effectiveness of nutrition supplementation by enhancing participation.

In-depth interviews (IDI) were conducted with 24 multiparous women in Matlab, Bangladesh to elicit information on pregnancy-related cultural issues and their experiences with supplement use. Quantitative analysis was conducted by using data from Maternal and Infant Nutrition Interventions at Matlab (MINIMat), a randomized controlled trial (factorial design of 2 food and 3 micronutrient groups) that collected extensive information on participants' (n=4,436 pregnant women) characteristics and program features. Supplement consumption was monitored monthly. Levels of participation were examined in terms of initiation and utilization of food, micronutrient, or combined supplements. Relationships between participation behaviors and potential factors were examined through multiple regressions.

Text analysis of the IDI revealed that culture-specific beliefs, attitudes, perceptions, and practices set boundaries to pregnant women's behaviors, including supplement consumption. Based on these results, a psychosocial model was developed to guide the quantitative analysis. Results from the quantitative analysis corroborated the findings from the qualitative analysis. Support from husbands or mothers-in-law, advice from program providers, positive attitudes toward supplementation, and participants' autonomy were positively associated with supplement

consumption, while cultural obligations, a possible cesarean delivery caused by a large-sized baby, poor appetite, and no perceived benefits were negatively associated with the consumption. Generally, participants consumed micronutrient more than food supplementation. Women who started to consume food before micronutrient supplements showed better participation than women with the reverse sequence. Sharing of food packages with others and replacing home meals with the supplements were prevalent. Only 10 % of participants consumed both types of nutrition supplements persistently.

These results show that food supplementation needs more attention for persistent participation when provided with micronutrient supplementation. To enhance pregnant women's participation, it is essential to understand socio-cultural environments of participants along with their perspectives about supplementation and design a program that addresses these issues

## BIOGRAPHICAL SKETCH

Jisung Woo studied 'Food and Nutrition' at Seoul National University in South Korea for her BS and became very interested in the field of nutrition, which made it possible for her to obtain academic performance-based scholarship for the entire four years of her undergraduate study. After she graduated with honors (*summa cum laude*), her interest in nutrition, which originally started from her childhood by the influence of her mother who worked for the Korean government as a nutritionist, made her pursue MS in Nutrition with a focus in clinical nutrition at her alma mater. The title of her thesis was "Effects of different dietary fats and carcinogen treatment on the hepatic microsomal drug metabolizing enzymes in hepatocellular carcinogenesis". During her 2 years of graduate education, she gained considerable understanding about biochemistry and various techniques for animal studies, including hepatectomy of rats to induce carcinogenesis. She also had opportunities to teach lab courses, such as 'Nutrition lab' and 'Organic chemistry lab'. In addition, she participated in a few projects in community nutrition as an assistant researcher and conducted nutrition assessments and surveys.

Based on all this background, she decided to study in the US to quality herself with more advanced academic and research experiences and studied 'General Epidemiology' at the School of Public Health, University of Michigan. Through the intensive training in epidemiology and biostatistics, she was able to gain knowledge and skills to apply nutritional knowledge and her experiences effectively in the real world. In addition, she was fascinated by the global perspectives of nutrition, which led her to volunteer work in Mongolia.

As soon as she obtained MPH from University of Michigan, She started her work in Mongolia as the chief researcher of a newly established research center within the Mongolian University of Science and Technology (MUST). During the two and a half years of work in Mongolia, she taught basic and advanced nutrition and statistics to graduate students and professors, trained researchers for conducting nutrition surveys, and organized numerous seminars on various issues in nutrition, such as child nutrition, diet therapy, hazard analysis critical control point (HACCP) for food service, and so on. Moreover, she helped to establish nutrition department within the School of Food and Biotechnology, MUST and by the time she left Mongolia, the university recruited the first students for this major for the first time in Mongolia.

Her experience in Mongolia opened her eyes to the world, especially to those who need nutrition interventions to have their basic rights to live health as human beings. Therefore after she returned to Korea, she engaged in a Christian missionary organization that was sending nutritionists to low income countries and supporting them in their professional work in nutrition. As the chief researcher of the research team of this organization, she played a leading role in organizing seminars and education courses and publishing books and manuals. Through all these experiences, she discovered her vocation for the rest of her life in improving the nutrition status of those who are suffering from malnutrition in low-income countries, which made her to apply for Ph.D. program in International nutrition at Cornell University.

The excellent educational experiences at Cornell University provided her with qualifications to be a professional in the field. Particularly, she selected Anthropology as her minor and conducted a qualitative study as a part of her dissertation, which expanded her research competence to social sciences. Teaching assistant experiences for numerous classes and

two oral presentations at Experimental Biology conference in 2011 and 2012 add more qualifications to her, all of which allowed her to have great opportunities to put her visions into practice. In fact, as a Ph.D. candidate, she started to work as a team manager of a Korean NGO, Wholistic Interest Through Health (WITH) and was involved with designing, implementing, monitoring, or evaluating a few nutrition projects. Currently she is preparing a 3-year community-based maternal and child nutrition project in Cambodia as the principal program manager.

# ACKNOWLEDGEMENTS

*I will walk among you; I will be your God, and you will be my people (Lev 26:12, NLT)*

Praise the Lord, God, who has guided me as my Father from the moment I had decided to pursue a doctorate until now and used all these times to make me suitable for being his people!

I would like to express my deepest appreciation to many individuals for their assistance, guidance, support and patience that enabled me to make through with my life dream. First of all, I thank my advisor, Dr. Kathleen M. Rasmussen for her unbelievable mentorship not only for academic achievement but also for life-challenging issues that I have faced. Her instantaneous feedback on my questions, concerns, and works, particularly her great insights for my research and advice on academic English writing, will not be forgotten. Without her persistent encouragement and passion that lasted for almost 10 years, I would not have been able to finish this dissertation. I am sure that she will be a role-model for my career life in the future.

I also thank my other committee members. Dr. Gretel Peltó helped me to open my eyes to a new research world and guided me to learn anthropological approach for my work. I am really fascinated by her inspiration and passion for nutritional anthropology and would like to follow her in my work in the future. Her encouragement also made me to continue to pursue this degree. I will really miss her warm and insightful comments and the times we spent together for great discussions. Dr. Rebecca Stoltzfus is another member I would like to follow, particularly her critical insights for research and programs in the field of international nutrition. Dr. Edward Frongillo Jr. led me to think about program participation not only from statistical but also from behavioral science point of view. Thanks to his generous guidance, I was able to analyze the



gigantic datasets from MINIMat. Dr. Kimberly O'Brien was the perfect field member for me. I will not forget various tips from her to make life and work balanced and chances to keep up my academic background she provided to me. I have to say that I had a dream team for my dissertation committee and really appreciate their invaluable support and guidance.

I also thank Dr. Jeff Sobal for his excellent teaching in Social science theories, which broaden my academic boundaries significantly. His generous and knowledgeable guidance is greatly appreciated. Also, it was my great honor to have datasets from MINIMat study and I appreciate all investigators' efforts to design and implement the study and the opportunity for me to conduct a secondary analysis. I was also fortunate to have great field advisor, Dr. Ruchira Naved at ICDDR., B. and field assistants Nazmun Nahar and Tapon Kumar. Their support and contribution to my work was crucial for me to conduct research at Matlab in 2009. Their generous assistances continued afterwards were also greatly appreciated. I also really appreciate mothers who joined the interviews I conducted at Matlab by bravely overcoming cultural barriers they had. Shahorin Moonzur is another person who contributed to my work significantly. Her time and efforts to check English translations of interview scripts were valuable to me. I am also grateful to Francoise Vermelyn for her excellent consultations on my statistical analysis. Her bright and clear suggestions are missed a lot. I would like to thank my advisor for my Master degrees, Dr. Heymie Choi and Dr. MaryFran Sowers. I was able to learn the ways to be a truthful teacher and researcher from them.

I would also like to acknowledge my funding sources, the small grant of Division of Nutritional Science and teaching assistantship that lasted 5 years. In addition, the experience of teaching Korean classes in Asian studies at Cornell was also valuable and I would like to express special thanks to Senior Lecturer Meejung Song. As an international student, I deeply

appreciated kind and generous assistance from the DNS administrative staff. I would like to give my special thanks to Gail Canterbury, Brandy Reeves, and Doralee Knuppenberg.

I am thankful for my colleagues in the Rasmussen Research Group. In particular, Eva Monterrosa and Christine Garner supported me in various ways as my office mates. The group support of Julia Felice, Liz O'Sullivan, Hilde Brekke, and Sarah Reyes will not be forgotten. I also appreciate the times with Cha-sook You, my moral supporter throughout my times at Cornell, and Sunny Kim, a great buddy from DNS.

I would like to extend my appreciation to my Korean colleagues, Yong Sook Lee who inspired me of considering international nutrition as my specialty and provided endless support for my study and personal life and Mi-ran Gwak who generously accommodate my work schedule to finish my dissertation. I also thank my colleagues at WITH (Wholistic Interest Through Health) for their untiring prayers and cheers for accomplishing my degree. Great social support from Yurim Choe and Eunju Lee is also greatly appreciated and the times we spent together will not be forgotten.

I also greatly appreciate what my mother-in-law has done for me. I am sure that she will be the only Korean mother-in-law who gives enormous support for her daughter-in-law without any reward. Her love and prayers were nutrients for my study at Cornell. Generous concerns and supports from my parents and father-in-law were also invaluable. My mother, as a nutritionist, has been guiding me and I respect her contribution to many people in Korea. I appreciate warm encouragement from my family members, Yoonji, Moonsup, Sunjoo, and Youngjoo and their spouses. Hasik Kim and Junsik Kim, my sons, got through all these processes with me and I really appreciate their understanding and firm trust for their mom. Last, but not least, I thank my husband, Younghan for his endless patience, love, and efforts for me.

# TABLE OF CONTENTS

<b>BIOGRAPHICAL SKETCH .....</b>	<b>iii</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>vi</b>
<b>TABLE OF CONTENTS .....</b>	<b>ix</b>
<b>LIST OF FIGURES .....</b>	<b>xiii</b>
<b>LIST OF TABLES.....</b>	<b>xiv</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>xvi</b>
<b>Chapter 1. Introduction.....</b>	<b>1</b>
1.1 Previous research on participation behaviors .....	2
1.2 Participants' beliefs and attitudes as underlying factors – the need of qualitative study .	4
1.3 Combination of interventions .....	6
1.4 Unique features of the MINIMat study .....	7
1.5 Mixed-method approach.....	10
1.6 Use of “participation” as a term for the behaviors of interest .....	12
1.7 Significance of the study .....	12
<b>Chapter 2. Cultural beliefs, perceptions, and practices of pregnant women in Matlab.....</b>	<b>14</b>
2.1 Introduction .....	15
2.2 Methods.....	17
2.2.1 Study population.....	17
2.2.2 Selection of informants.....	17
2.2.3 Data collections .....	18
2.2.4 Data analysis .....	21
2.3 Results .....	22
2.3.1 Fear .....	22
2.3.2 Delivery-related concerns.....	32
2.3.3 Culture-specific rules.....	37
2.3.4 Family's influence .....	42
2.3.5 Dietary practices .....	46
2.4 Discussion.....	49
<b>Chapter 3. The influence of cultural context on participation in a nutrition supplementation program.....</b>	<b>55</b>
3.1 Introduction .....	56
3.2 Methods.....	58
3.2.1 Study population.....	58
3.2.2 Selection of informants.....	58
3.2.3 Data collections .....	58
3.2.4 Data analysis .....	60
3.3 Results .....	61
3.3.1 Cultural beliefs and perceptions .....	61

3.3.2	The influence of family .....	67
3.3.3	The influence of medical professionals .....	73
3.3.4	Expected benefits and perceived benefits.....	75
3.3.5	The individual will of pregnant women .....	78
3.3.6	Other facilitators and barriers for nutrition supplement use .....	80
<b>3.4</b>	<b>Discussion .....</b>	<b>83</b>
<b>Chapter 4.</b>	<b>Intra-cultural diversity and development of a theoretical model.....</b>	<b>93</b>
<b>4.1</b>	<b>Intra-cultural diversity .....</b>	<b>93</b>
<b>4.2</b>	<b>Development of a theoretical model.....</b>	<b>98</b>
<b>Chapter 5.</b>	<b>Factors affecting participation behaviors related to the separate and combined use of food and micronutrient supplements in rural Bangladesh</b>	<b>109</b>
<b>5.1</b>	<b>Introduction .....</b>	<b>110</b>
<b>5.2</b>	<b>Methods .....</b>	<b>112</b>
5.2.1	Study setting .....	112
5.2.2	Study subjects .....	113
5.2.3	Intervention.....	113
5.2.4	Data collections .....	115
5.2.5	Measurements and variable developments .....	116
5.2.6	Statistical Analysis.....	131
<b>5.3</b>	<b>Results .....</b>	<b>132</b>
5.3.1	Baseline characteristics of participants.....	133
5.3.2	Initiation.....	135
5.3.3	Utilization of nutrition supplements .....	147
<b>5.4</b>	<b>Discussion .....</b>	<b>173</b>
5.4.1	Participation behaviors .....	174
5.4.2	Factors affecting participation behaviors.....	177
5.4.3	Limitations.....	191
5.4.4	Strengths .....	193
5.4.5	Conclusions and implications.....	195
<b>Chapter 6.</b>	<b>Conclusions.....</b>	<b>197</b>
<b>6.1</b>	<b>Purpose of the dissertation.....</b>	<b>197</b>
<b>6.2</b>	<b>Unique features of the dissertation .....</b>	<b>197</b>
<b>6.3</b>	<b>Mixed-method approach.....</b>	<b>198</b>
<b>6.4</b>	<b>Main results.....</b>	<b>198</b>
<b>6.5</b>	<b>Future research .....</b>	<b>201</b>
<b>6.6</b>	<b>Conclusions and implications .....</b>	<b>203</b>
6.6.1	Importance of understanding cultural features that surround participants .....	203
6.6.2	Information about potential to benefit in participation from demographic characteristics of participants .....	204
6.6.3	Program features for planning and implementing future programs .....	205
6.6.4	Active involvement of family members for more participation of pregnant women .....	206
6.6.5	Important roles of program providers to increase awareness about nutrition supplementation.....	207
6.6.6	Important roles of participants as main decision-makers in participating in nutrition .....	

supplementation .....	208
<b>Appendix</b>	
<b>1.1 Consent form for the interviews .....</b>	<b>211</b>
<b>1.2 Interview guide used for interviews.....</b>	<b>215</b>
<b>2. Pregnant women’s responses according to emerged themes.....</b>	<b>220</b>
<b>2.1. Fears .....</b>	<b>220</b>
2.1.1 Maternal death .....	220
2.1.2 Fetal death .....	228
2.1.3 Abnormal birth outcomes .....	231
<b>2.2 Delivery related concerns .....</b>	<b>232</b>
2.2.1 Big baby.....	232
2.2.2 Cesarean section and episiotomy.....	234
2.2.3 Delivery places .....	235
<b>2.3 Culture-specific rules .....</b>	<b>238</b>
2.3.1 Do’s.....	238
2.3.2 Don’ts .....	240
<b>2.4 Family’s influence.....</b>	<b>243</b>
2.4.1 Role of family members .....	243
2.4.2 Family’s concern – economic status .....	248
<b>2.5 Dietary Practices .....</b>	<b>250</b>
<b>3. Pregnant women’s experiences with nutrition supplementation programs .....</b>	<b>254</b>
<b>3.1 Cultural beliefs and perceptions .....</b>	<b>254</b>
3.1.1 Alga.....	254
3.1.2 Allah .....	254
3.1.3. Belief concerning big baby.....	255
3.1.4. Perception on appetite .....	256
3.1.5. Other beliefs and perceptions .....	257
<b>3.2 Family’s influence.....</b>	<b>258</b>
3.2.1 Role of husbands and mothers-in-law .....	258
3.2.2 Economic status of a household .....	260
3.2.3 Sharing the supplements with family members and replacement of home diet ..	262
<b>3.3 Influence of medical professionals .....</b>	<b>264</b>
<b>3.4 Expected benefit and perceived benefit .....</b>	<b>269</b>
<b>3.5 The will of pregnant women.....</b>	<b>273</b>
<b>3.6 Other facilitators and barriers for nutrition supplement use .....</b>	<b>275</b>
3.6.1 Morning sickness (or vomiting) .....	275
3.6.2 Acceptability of the supplements.....	276
3.6.3 Other barriers .....	277
<b>4. Detailed results from quantitative analysis.....</b>	<b>279</b>
<b>4-1 Descriptions of variables used in the analysis of initiation and utilization.....</b>	<b>279</b>
<b>4-2 Crude and adjusted odds ratio for factors in initiating food and both types of     supplementation among MINIMat participants .....</b>	<b>284</b>
<b>4-3 Factors associated with durations of utilizing food, micronutrient, and combined     supplementation among MINIMat participants .....</b>	<b>287</b>

4-4 Factors associated with intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants .....	291
4-5 Factors associated with patterns of intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants .....	295
4-6 Factors associated with persistent consumption of food, micronutrient, and combined supplements among MINIMat participants .....	299
4-7 Factors associated with sharing food packages with others and replacing home meals with food supplements among MINIMat participants .....	303
4-8 SAS commands used for conducting multiple logistic regressions for model selections by employing multiple imputations for missing values in explanatory variables – examples of full models. ....	307
4-9 Model selection process performed in this study .....	311
4-10 List of MINIMat datasets used for this study.....	313
References .....	314

## LIST OF FIGURES

[Figure 1] Participation behaviors and factors affecting the behaviors .....	2
[Figure 4-1] The Original Formulation of the Health Belief Model.....	99
[Figure 4-2] The Theory of Reasoned Action and Planned Behavior.....	100
[Figure 4-3] Social Cognitive Theory – Triadic Reciprocal Determinism .....	101
[Figure 4-4] The Attitude- Social influence – Efficacy Model .....	103
[Figure 4-5] The modified Attitude- Social influence – Efficacy Model.....	104
[Figure 4-6] The theoretical model for the present study .....	105
[Figure 5-1] Flow chart of participants .....	120
[Figure 5-2] Classification of participation – According to the sequence of initiation of consuming supplements.....	123
[Figure 5-3] The theoretical model developed based on the qualitative study .....	125

## LIST OF TABLES

[Table 5-1]	Comparison groups of combined initiation behaviors of food and micronutrient supplementation among MINIMat participants .....	118
[Table 5-2]	Comparison groups for time until initiation in combined supplementation of food and micronutrient among MINIMat participants.....	118
[Table 5-3]	Comparison groups of patterns of combined supplementation of food and micronutrient among MINIMat participants .....	122
[Table 5-4]	Baseline characteristics of participants.....	134
[Table 5-5]	Comparison of baseline characteristics between dropouts and non-dropouts for initiation of food, micronutrient, and combined supplementation among MINIMat participants.....	136
[Table 5-6]	Initiation status of MINIMat participants according to supplementation groups	137
[Table 5-7]	Factors affecting initiation of FS and combined supplementation among MINIMat participants.....	138
[Table 5-8]	Frequency of cultural features according to initiation status of food, micronutrient, and combined supplementation among MINIMat participants .....	140
[Table 5-9]	Factors considered in the development of a model to explain initiation of FS and CS among MINIMat participants .....	143
[Table 5-10]	Selected factors explaining initiation behaviors of MINIMat participants in relation to food and combined supplementation, considering both external and psychosocial variables .....	144
[Table 5-11]	Comparison of frequencies of earlier and later initiators of food, micronutrient, and combined supplementation among MINIMat participants .....	145
[Table 5-12]	Factors significantly associated with early initiation of food, micronutrient, and combined supplementation among MINIMat participants .....	146
[Table 5-13]	Comparison of baseline characteristics between dropouts and non-dropouts for utilization .....	148
[Table 5-14]	Utilization of nutrition supplement – total consumption, duration, and intensity by intervention groups of MINIMat .....	149
[Table 5-15]	Comparison of mean consumption and intensity by duration in MINIMat .....	150
[Table 5-16]	Factors significantly ( $p < 0.001$ ) affecting durations of food, micronutrient, and combined supplementation among MINIMat participants .....	152
[Table 5-17]	Factors included in the model explaining duration of food, micronutrient, and combined supplementation among MINIMat participants .....	149
[Table 5-18]	Factors significantly affecting intensities of food, micronutrient, and combined	



supplementation among MINIMat participants .....	155
[Table 5-19] Parameter estimates of factors with different results in adjusted analyses of total consumption and intensity of food, micronutrient, and combined supplementation among MINIMat participants .....	158
[Table 5-20] Factors included in the model explaining intensity of food, micronutrient, and combined supplementation among MINIMat participants .....	158
[Table 5-21] Frequencies of patterns in food, micronutrient, and combined supplementation among MINIMat participants .....	160
[Table 5-22] Factors affecting patterns of intensities of food, micronutrient, and combined supplementation among MINIMat participants .....	162
[Table 5-23] Factors included in the model explaining consumption of supplements with continuously high intensities in food, micronutrient, and combined supplementation among MINIMat participants .....	164
[Table 5-24] Comparison of frequency, duration, and intensity between persistent consumers and others in food, micronutrient, and combined supplementation in MINIMat....	165
[Table 5-25] Factors associated with persistent consumers of food, micronutrient, and combined supplementation among MINIMat participants.....	166
[Table 5-26] Factors included in the model explaining persistent utilization of nutrition supplements in food, micronutrient, and combined supplementation among MINIMat participants .....	168
[Table 5-27] Comparison of basic characteristics between different sequence groups among MINIMat participants .....	170
[Table 5-28] Comparison of participation behaviors between different sequence groups among MINIMat participants .....	171
[Table 5-29] Factors associated with other participation behaviors regarding food supplementation among MINIMat participants.....	172

## LIST OF ABBREVIATIONS

<b>AIC</b>	Akaike information criterion
<b>BCC</b>	Behavior Change Communications
<b>BINP</b>	the Bangladesh Integrated Nutrition Projects
<b>BMI</b>	Body Mass Index
<b>BRAC</b>	Bangladesh Rural Advancement Committee
<b>CHW</b>	Community Health Workers
<b>CNC</b>	Community Nutrition Center
<b>CNP</b>	Community Nutrition Promoters
<b>Conc.</b>	Concentration
<b>DX</b>	Disease
<b>EM</b>	Expectation-Maximization algorithm
<b>FIML</b>	Full Information Maximum Likelihood
<b>FS</b>	Food Supplementation
<b>Fs</b>	Food supplements
<b>Hb</b>	Hemoglobin
<b>HH</b>	Household
<b>ICDDR, B.</b>	the International Centre for Diarrhoeal Disease Research, Bangladesh
<b>IDI</b>	In-depth interview
<b>MCMC</b>	Markov chain Monte Carlo
<b>MINIMat</b>	Maternal and Infant Nutrition Interventions at Matlab

<b>MIL</b>	Mother-in-law
<b>MMS</b>	Multiple Micronutrient Supplementation
<b>MN</b>	Micronutrient
<b>MNS</b>	Micronutrient Supplementation
<b>MNs</b>	Micronutrient supplements
<b>NGO</b>	Non-government organization
<b>Preg</b>	Pregnancy
<b>UNICEF</b>	the United Nations Children's Funds
<b>WHO</b>	World Health Organization

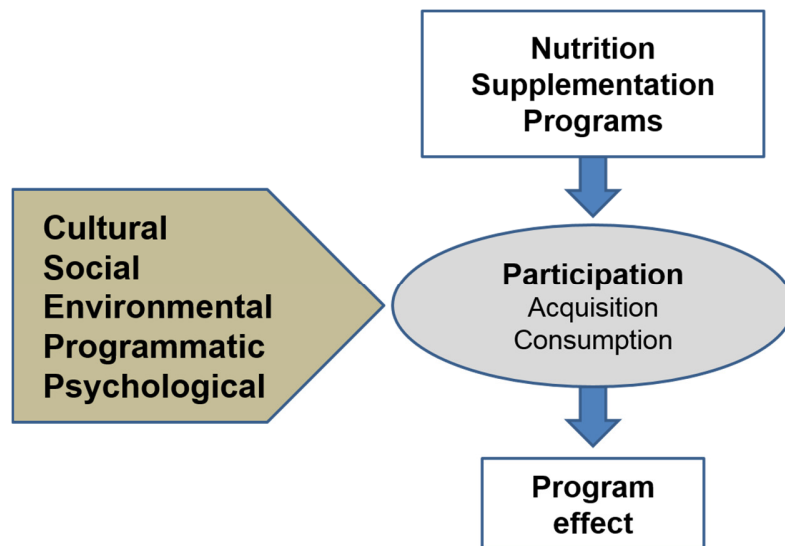
## Chapter 1. Introduction

Maternal and child malnutrition are persistently high in most low income-countries and are an underlying cause of 3.5 million deaths in children younger than 5 years old <sup>1</sup>. Inasmuch as maternal nutrition may influence the health of the mother and the baby at birth as well as later in their lives, various efforts have been undertaken to improve nutritional status of pregnant women <sup>2-5</sup>. Many countries have implemented food and/or micronutrient supplementation programs to address maternal nutrition problems and improve health, particularly birth weight of newborns <sup>2,3,6-9</sup> based on the favorable health outcomes of multiple efficacy trials <sup>10-16</sup>. The effectiveness of these interventions in real communities, however, has been inconsistent <sup>3,6,17-22</sup>.

There are several reasons for this inconsistent effectiveness. These include differential physiological response to supplementation of program participants according to the participants' specific characteristics; insufficient provision of supplements due to problems with supply, procurement, and distribution; low coverage of the targeted women by programs; ineffective delivery of programs by health workers; inadequate education or counseling of mothers; and behaviors of participants, including low uptake of the supplementation regimens <sup>3,8,9,11,14,17,23-26</sup>.

Low adherence, which means the lack of persistent use of supplements when a close supervision is absent <sup>27</sup>, is a particular concern as it could result in 'false negatives' of the effects for supplementation <sup>28</sup>. This also could explain the differences in the effects of supplementation between efficacy trials and real programs as the levels of adherence in efficacy trials of iron and micronutrient supplementation have been much higher (74-98%) <sup>29-33</sup> than those of community-based or national programs (16-70%) <sup>8,34-37</sup>. Therefore, the research described here considered various behaviors of pregnant women in participating in a nutrition supplementation program

and examined cultural, social, psychological and environmental factors for explaining these behaviors hoping to find ways to improve the effectiveness of nutrition intervention programs (Figure 1).



[Figure 1-1] Participation behaviors and factors affecting the behaviors

## 1.1 Previous research on participation behaviors

Program participation is an important component in any interventions. For pregnant women, most research has concerned utilization of antenatal care programs <sup>38-47</sup> rather than participation in nutrition supplementation programs. Factors that have been associated with the antenatal care use in developing countries include maternal education, husband's education, marital status, availability, cost, household income, women's employment, media exposure, previous obstetric complications, parity and cultural beliefs and ideas <sup>47</sup>. To enhance pregnant women's participation in antenatal care programs, however, additional modifiable factors need to be identified. Women's beliefs, attitudes and perceptions toward their pregnancies as well as the services from the antenatal care programs, and women's social, political and economic status

appear to be essential components in decision-making process of seeking cares, which requires more research <sup>43,47,48</sup>.

Non-compliance has been one of the major issues in medicine as well<sup>49-52</sup>, where the term compliance includes not only following medical advice but also seeking cares or keeping follow-up appointments. It is used separately for medical adherence because it emphasizes the paternalistic role of health care providers <sup>49</sup>. Inasmuch as non-compliance is a serious problem that undermines the effectiveness of medical treatment <sup>51-54</sup>, determinants of patients' compliance have been extensively studied since the 1970s <sup>51,55-58</sup>. In spite of the lack a common operationalization of the concept of compliance as well as a gold standard for measuring compliance, more than 200 factors have been identified as either general or disease-specific determinants of medical compliance <sup>49,52,59-61</sup>. In general, demographic variables are poor indicators of adherence to medical treatment <sup>52,62</sup>, while the characteristics of the regimen, such as the complexity, duration, convenience, and cost, are closely related to the degree of compliance <sup>52,54,63</sup>. Sociocultural circumstances, knowledge, personality, and educational level of patients have been noted as important determinants of medical compliance as well <sup>24,54,64</sup>. Although none of these factors is not consistently related to or fully predictive of patient's adherence to the prescribed regimen <sup>52,60,65</sup>, they have been used as targets for improving compliance <sup>49,52,61</sup>. Research has been shown that to improve compliance, a combination of strategies is better than a single approach, and both educational and behavioral strategies are effective when applied together <sup>52</sup>. The doctor-patient relationship, in particular, has recently gained attention as an effective way to increase patient's compliance, which requires the doctor's efforts to elicit patients' beliefs and to acknowledge their perceptions <sup>52</sup>.

As for nutrition supplementation, low intake of supplements has been suggested as a

factor that needs more attention of both program implementers and researchers. This is because less-than-expected consumption of supplements can significantly interfere with the desired program outcomes <sup>3,8,9,11,14,17,22,23,25,26,37,66</sup>. Relatively few comprehensive studies, however, have been conducted among pregnant women to identify problems with as well as determinants of low participation behaviors, including acquisition and consumption of the supplements <sup>67,68</sup>. Most investigations, even the major supplementation trials, reported either the overall rates of taking the supplements assigned or the monotonic linear relationship between adherence and the outcome of interest <sup>29,30,32,33,69</sup>.

Iron supplementation is an exception, however. As a result of the discrepancy between the results of efficacy trials and effectiveness in iron supplementation programs, several studies have investigated factors associated with the low consumption of the supplements <sup>20,22,67,68</sup>. Insufficient service delivery, adverse side-effects, lack of perceived benefit, lack of motivation of health workers and recipients, and other personal characteristics have been associated with low adherence to iron supplementation regimens <sup>3,11,20,22,24,25,37,67,70</sup>. Although efforts have been made to increase the intake of iron supplements by reducing side-effects <sup>21</sup> and the frequency of the pills <sup>20,22,71,72</sup>, more factors need to be identified to resolve the problems of low adherences <sup>20,21</sup>. Moreover, in the case of food supplementation interventions, the determinants of participation behaviors as well as the level of participation are poorly understood <sup>37,62,68,73</sup>.

## **1.2 Participants' beliefs and attitudes as underlying factors – the need of qualitative study**

The importance of understanding participants' beliefs and attitudes has been addressed in association with medical compliance <sup>52</sup> and reflected in a few psychosocial models, which have

been used to explain patients' compliance behaviors in medicine <sup>74-77</sup>. According to the Health Belief Model and the Theory of Reasoned Action (TRA)/Theory of Planned Behavior (TPB), personal factors, including the beliefs and attitudes of patients, are directly associated with both behavioral intention and actual behavior <sup>78,79</sup>. Accordingly, the importance of relationship between doctor and patient has gained attention that doctors need to acknowledge patient's perspectives toward the prescribed regimen, particularly those involving behavioral changes, to lead to better compliance of their patients <sup>24,52,64,65,80</sup>. In relation to healthcare-seeking behaviors of pregnant women, understanding and respecting participant's attitudes and perceptions have been noted as important factors to be considered to facilitate the women's participation as well <sup>48,81-83</sup>. Researchers have reported that one of the reasons that provision of services does not guarantee their utilization the lack of understanding the differences in perspectives between providers and recipients <sup>41,43,83,84</sup>. It has been also suggested that incorporating cultural beliefs in a preventive health care services can be a strategic way to implement an effective program beyond the scope of medicine <sup>81</sup>.

Although behaviors associated with the uptake of nutrition supplementation for pregnant women are different from those involved in medical regimens for patients or other prenatal care services, the impact of such personal factors on participation behaviors is still important to consider. This is because poor understanding of cultural beliefs and attitudes and little consideration of local practices in intervention programs have been suggested as another possible reason for lack of effectiveness of nutrition supplementation <sup>20,68</sup>. This is also because pregnancy itself is associated with unique culture-specific beliefs and perceptions, that could affect the participation behaviors of pregnant women <sup>43,48,85-91</sup>. Particularly, in low-income countries, where maternal mortality and infant mortality are very high, culture-related beliefs on risks during



pregnancy are prevalent <sup>68</sup>. For example, reducing food intake during pregnancy is a widely accepted practice based on cultural beliefs <sup>92-95</sup>. Foods are easily restricted or modified to assure successful delivery, which in turn can influence participation in and adherence to nutrition supplementation considerably <sup>68,92,95,96</sup>. Foods of certain colors or appearance are avoided because they are believed to be harmful to the fetus in certain countries where the concept of “hot and cold” plays an important role in disease etiologies <sup>97,98</sup>.

In a few studies, beliefs and concerns with nutrition supplementations among pregnant women have been examined. Women tend to fear the birth of big babies, too much creation of blood, miscarriage, changes in appetite and constipation, some of which were believed to be caused by taking iron supplements <sup>20,67,68,70,85,95,98-101</sup>. In India, pregnant women did not take the supplement because the tablets were regarded as “hot” based on their cultural beliefs, which might cause miscarriage <sup>98</sup>. More comprehensive studies are required, however, to elicit additional culture-bounded beliefs, attitudes, and the perceptions of pregnant women and examine the relationship of these factors with the actual participation behaviors

<sup>20,21,24,67,68,70,85,90,95,98-104</sup>.

### **1.3 Combination of interventions**

Many community programs for pregnant women are implemented as a combination of different types of interventions, including vitamin A supplementation, iron or multiple micronutrient supplementation, food supplementation, vaccination, deworming, and education on health, nutrition, hygiene, and breastfeeding <sup>105,106</sup>. But participation behaviors tend to be examined in the context of a single type of intervention, which makes it difficult to compare the potential determinants across different types of programs. Particularly, in combined interventions

of nutrition supplementation, the distinct features of each supplement can affect participants' behaviors toward the complex supplementation regimen differently from when each is administered independently. Therefore, to predict or explain the pregnant women's behaviors better, a comprehensive investigation that takes into account such complex conditions is needed.

#### **1.4 Unique features of the MINIMat study**

Maternal and Infant Nutrition Interventions at Matlab (MINIMat) was a large, randomized, controlled trial of pregnancy supplementation conducted in Matlab, Bangladesh, from 2001 to 2004 <sup>107</sup>. In the MINIMat study, pregnant women were invited at one of two different times ('early' vs. 'usual') to start to consume food supplement packages that contained rice powder (80 g), roasted lentil powder (40 g), molasses (20 g), and soy oil (12 mL). Participants were asked to come to the local community nutrition center (CNC) six days per week to consume this package by mixing all the ingredients together (Figure 1-2). The formula of this package was originally designed for the Bangladesh Integrated Nutrition Projects (BINP) run by Bangladesh Rural Advancement Committee (BRAC)<sup>108</sup>. This formula was substantial in its amount to be consumed at a time and had potential issues of palatability or acceptability to the participants. The formula, however, was not changed for MINIMat study so as to be in line with the infrastructures for producing food supplements locally that BINP had already set up (from personal conversation with Kathleen M. Rasmussen, September 29<sup>th</sup>, 2016). Compared with BINP, where pregnant women with body mass index (BMI) < 18.5 (kg/m<sup>2</sup>) were included, the MINIMat study expanded its inclusion criterion to all pregnant women. This decision was based on the findings from a study that showed relatively well nourished pregnant women (BMI ≥ 18.5 kg/m<sup>2</sup>) could also respond to food supplementation by having better birth weights and maternal

weight gains<sup>109</sup>.



[Figure 1-2] Pictures of children consuming the food supplement mixture provided by BRAC at a community nutrition center (taken in July 2009 by Jisung Woo) \*

\*The food supplement pregnant women in MINIMat study had consumed was twice the volume of the mixture children's in this picture ate

The MINIMat study was funded by the United Nations Children's Funds (UNICEF) with the interest of conducting an efficacy trial of multiple micronutrient supplementation (MMS) developed by UNICEF that included 30 mg of Fe with other micronutrients <sup>107</sup>. For this intervention, however, three micronutrient supplementation groups were included: a group with 30 mg of Fe with folic acid as an alternative to the MMS, a group with 60 mg of Fe with folic acid as the global standard recommended by the World Health Organization (WHO) at the time of MINIMat study<sup>110</sup>, and the MMS group.

Nutrition education, including behavior change communications (BCC), was expected to be offered to the MINIMat participants during their visits at CNCs through education sessions by community nutrition promoters (CNP) and radio messages in public, but it seemed that the education was not supervised properly, and, hence, the actual implementation was questionable (from personal communication with Edward Frongillo, Jr., October 6<sup>th</sup>, 2016). Nonetheless,

posters for nutrition education were attached to the wall of CNCs (by observation, Figure 1-3).



[Figure 1-3] Pictures of nutrition education posters available at a CNC (taken in July 2009 by Jisung Woo)

MINIMat provided excellent conditions to explore participation behaviors toward nutrition regimens and their associated factors from various perspectives. This was because extensive information of pregnant women, including demographic, socioeconomic and behavioral factors, was available. The comprehensive survey questions of MINIMat study also made it possible to examine several psychosocial variables in this dissertation even though the questionnaires were not originally designed to measure some other psychological constructs.

Inasmuch as women in this trial received both supplemental food packages and micronutrient supplementation pills at the same time, it was possible to examine whether or not they participated in either or both programs. It was also possible to examine the participants' differential behaviors toward the two types of supplements when they were administered simultaneously. The proscription of additional food, prevalent during pregnancy in Bangladesh<sup>92-95,111</sup>, also enabled us to examine the effect of personal beliefs and attitudes toward nutrition supplementation and the degree and causes of replacement of home diet by supplements. Furthermore, well-planned and implemented nutrition interventions that take into account

findings from the proposed study, particularly components related to better participation, will benefit not only pregnant women in Bangladesh but also those in countries where appropriate nutrition interventions are in need to improve maternal and infant health.

## **1.5 Mixed-method approach**

A mixed-methods approach, the third research paradigm <sup>112</sup>, incorporates both qualitative and quantitative research methods into a single study to answer research questions <sup>112-114</sup>. The combination of the two methods expands the understanding and provides holistic views on the issues under investigation <sup>112</sup> by compensating the weaknesses of, corroborating the results from, providing insights to the design of, enhancing the interpretation of results from, and finding conflicts in the results from each method <sup>80,113,114</sup>. Therefore, considering the complexity of participation behaviors of pregnant women who received two different types of supplements simultaneously, it seems appropriate to employ both qualitative and quantitative methods to explain the participants' behaviors toward the nutrition supplementation comprehensively.

A mixed-methods approach is an important way to acknowledge culture-related features as potential factors influencing the participation behaviors in this study. To explore cultural beliefs, attitudes, and perceptions, it is important to maintain an attitude of learning from the participants about their cultures, experiences, and opinions and gain understanding about participation behaviors from the pregnant women's perspectives <sup>115-117</sup>, particularly when the researcher is from the outside of the study area. This could enlighten researchers about culture-related reasons associated with pregnant women's differential consumption of supplements and explain why and/or how a certain participation behavior is facilitated or hindered by the cultural factors <sup>52,65,70,80,85,98,102</sup>. Qualitative research can be used to investigate these potential factors

affecting participants' behaviors as the nature of the qualitative approaches, particularly in-depth interviews and narratives, enables study participants to elicit their own perspectives to researchers<sup>115,116</sup>. Qualitative research also concerns more of processes than outcomes, which makes it possible to reveal potential mediators for a better participation in nutrition supplementation, which cannot be investigated by a standardized survey questionnaire<sup>113; 80</sup>

As a part of MINIMat, an ethnographic study was conducted to identify cultural features associated with low birthweight from 2000 to 2001 in Matlab, Bangladesh by interviewing seven pregnant mothers, one father, and four health providers and observing observations of 5 households and CNCs<sup>111</sup>. This study illustrated cultural features in relation to pregnancy, including risks during pregnancy and perceived stages of pregnancy and fetal development and social context of shame and household decision-making along with experiences of consuming food and micronutrient supplements<sup>111,118</sup>.

The qualitative study of this dissertation confirmed these findings and provided greater understanding about cultural features and their relationships with the use of the supplements. In addition, based on the results of this qualitative research, a theoretical psychosocial model was developed to guide the quantitative study of this dissertation.

Finally, the extensive available information about more than 4,000 participants from the MINIMat study provided enough reasons for conducting quantitative analysis as the follow-up of the qualitative work. The influences of external personal factors, such as demographic and socioeconomic characteristics, on the behaviors of interest were determined quantitatively. Moreover, internal factors, including psychosocial variables, collected from separate sets of questionnaires acted as a bridge to combine the results from both quantitative and qualitative analyses and provided a comprehensive view for interpreting the results.

## **1.6 Use of “participation” as a term for the behaviors of interest**

As briefly mentioned in the previous sections, it is compliance or adherence that have been used to indicate the extent to which a participant followed a regimen prescribed or assigned by a health or a program provider <sup>27,49,52</sup>. In many cases, these two terms have been used interchangeably even though their meaning differ slightly from each other: compliance implies submissive attitude of participants <sup>49</sup> whereas adherence emphasizes partnership and agreement between providers and participants <sup>27,49,52</sup>.

The behaviors under investigation in this study included a series of actions involved in acquiring and consuming the supplements, however, which might not be covered by either compliance or adherence. A participant was considered as an active agent who was responsible for these behaviors rather than passively following what had been prescribed or assigned by the healthcare providers. Whether or not a pregnant woman ever started to acquire and consume the supplements, how persistently a woman consumed the assigned supplements, and how differentially a woman took the two different types of supplements were also behaviors of interest in this research, which might not be represented by the proportion of the number of consumed to the number of assigned supplements, typically used in compliance and/or adherence research. Therefore, in this study, participation, rather than compliance or adherence, was used to acknowledge the active role of a pregnant woman in joining in and continuing nutrition supplementation and indicated the behaviors that embraced various actions associated with the uptake of the supplements.

## **1.7 Significance of the study**

This study is composed of the following main chapters:

- Chapter 2 is a qualitative study that ethnographically describes various cultural features associated with pregnancy and delivery in the context of a rural Bangladesh and provides cultural background to understand the following chapter.
- Chapter 3 is a qualitative study that illuminates the relationship between culture-related factors and participation behaviors of pregnant women and suggests potential determinants that needs to be considered in the quantitative analysis that follows.
- Chapter 4 provides a psycho-social model that presents a theoretical framework to conduct quantitative analysis.
- Chapter 5 is a quantitative study that statistically examines the relationship between potential determinants with various participation behaviors.
- Chapter 6 provides conclusion and future directions

This study adds knowledge and provides insights to understand pregnant women's behaviors in participating in nutrition supplementation programs by examining several different behaviors in acquiring and consuming the supplements when two different kinds of nutrition supplements are provided simultaneously. Identification of factors associated with these behaviors provides information about modifiable factors to improve the effectiveness of nutrition programs. Cultural beliefs and attitudes, the potential underlying factors, enhance our comprehension on pregnant women's decision-making associated with nutrition supplementation, which lead to their behaviors. The unique features of the MINIMat study have permitted us to examine all of these features and provide a model for the future nutrition intervention programs for pregnant women.



## Chapter 2. Cultural beliefs, perceptions, and practices of pregnant women in Matlab

### Abstract

Understanding socio-cultural environment of pregnant women is important to design an effective community-based programs. An ethnographic study was conducted to explore cultural features associated with pregnancy in a rural area of Bangladesh. In-depth interviews (IDI) were conducted with 24 pregnant or newly delivered multiparous women. A semi-structured interview guide was used to elicit information on pregnancy-related cultural issues. Text analysis revealed that expectations about appropriate behaviors during pregnancy embedded in culture-specific beliefs, attitudes, perceptions, and practices. Fears about fetal or maternal death and abnormal birth outcomes were the primary concerns among pregnant women. Physical weakness and anemia were perceived to foreshadow these risks. Allah and *Alga* were believed to have decisive roles in pregnancy-associated risks, which resulted in specific practices, including keeping the cultural rule of *Khen*, offering *namaz*, praying and fasting. Regarding a big-sized baby, women showed bidirectional attitudes. Some were concerned about the size of a baby in relation to a possible cesarean delivery or an episiotomy that cost high. Conversely, many women preferred to have a big-sized baby because the baby was considered strong and healthy. Although many women expressed that they did not practice ‘eating-down’ during pregnancy, they reduced their food intakes throughout their gestational periods because of loss of appetite or lack of food. In addition, pregnant women were told to follow various cultural norms, many of which were centered on their food consumptions and mobility. Husbands and mothers-in-laws were main caretakers of pregnant women who influenced behaviors of pregnant women significantly. Poor economic status of the household put more constraints to pregnant women, particularly in relation to food intake and healthcare-seeking behaviors. Inasmuch as these cultural environments set boundaries to pregnant women’s behaviors, it is imperative to understand these cultural issues when a nutrition program in a rural area of Bangladesh that involves behavior changes of pregnant women is considered.

## 2.1 Introduction

Pregnancy encompasses the complicated changes a woman faces in having a baby. Inasmuch as these changes are not limited to physiological alterations and expand to psychological, cultural, and social aspects<sup>91</sup>, behaviors of a woman during her pregnancy need to be understood from the biocultural point of view<sup>90,119,120</sup>. As a result, to provide a nutrition program that is acceptable to pregnant women, it is imperative to consider various aspects of pregnancy, particularly when the program requires participants to change their behaviors.

In this respect, understanding a culture is of great concern as “culture” provides a pregnant woman with ideas and concepts with which to interpret her experience and take actions in a society<sup>90,117,120</sup>. This is important because many societies have their own cultural beliefs and practices concerning pregnancy, from conception through delivery<sup>43,48,85,91,121</sup>, reflecting the importance of having offspring for the existence of a society<sup>91</sup>. According to previous studies, women’s attitude toward their own pregnancies<sup>47,48,83,99,122,123</sup>, perceptions of health risks during pregnancy<sup>48,94,124</sup>, rituals related to delivery<sup>87,91,92,95,125</sup>, and cultural beliefs and taboos<sup>43,93,95,99,122</sup> are essential to take into account when it comes understanding the health behaviors of pregnant women, including uptake of nutrition supplements.

Food proscription and/or prescription, for example, are cultural practices of pregnant women in many parts of the world<sup>88,90,91,96,124,126,127</sup>. Particularly, the restriction of energy consumption during pregnancy is a well-known, culture-related phenomenon in South Asia, including Bangladesh. This is practiced to avoid having a large-sized baby, which might cause pain and obstruction during delivery<sup>86,93,94,119,127</sup>. Certain food items, such as pineapples, fish, meat, and vegetables, are also avoided in this region because they are thought to cause miscarriage<sup>85,92,93,125,126,128</sup>.

There are also area-specific differences, however, in the extent to which women abide by these cultural advices. For instance, although women preferred to have a small-sized baby, the degree to which they restricted their food intake differed between north and south part of Kanara, India <sup>93,94,129</sup>. Two neighboring districts in Karnataka, a rural state of south India, showed quite different practices in reducing food consumption during pregnancy <sup>127,130</sup>. In certain areas of Bangladesh, only a limited number of pregnant women took less food due to the fear of having a big baby <sup>125,129,131</sup>. Similar findings as to variances in responding to cultural norms are also reported with other cultural features, such as food preference <sup>86,87,92,93,126</sup>, women's physical mobility <sup>132-135</sup> and impact of evil spirit on pregnancy <sup>43,126,136,137</sup>, each of which requires a study to examine the area-specific cultural features.

Ethnography aims to describe a culture learned from the members of a society of the culture <sup>117</sup>. In an ethnographic study, a researcher plays the learner rather than the investigator to gain perspectives of the people in the study <sup>117</sup>, so called “emic” view <sup>115,116,119</sup>. The “emic” approach is characterized as the efforts to “discover and describe a culture in reference to the way in which the various elements of that culture are related to each other” <sup>116</sup> <sup>1</sup> whereas the “etic” approach holds objective outsider's views and concerns generalization of the data under investigation <sup>115,116,119</sup>. Inasmuch as actions of people and meanings of events are deeply embedded in the culture of a society <sup>117</sup>, it is imperative to learn the native's point of view to better understand people's behaviors in the light of the culture <sup>90,115</sup>.

Therefore, this chapter describes the women's perspectives concerning cultural features associated with their pregnancies in Matlab, Bangladesh, by employing an ethnographic

---

<sup>1</sup> Directly cited from p8

approach. By understanding how women in a rural area of Bangladesh view their pregnancies and the beliefs, attitudes, perceptions, and practices associated with it, this chapter serves as a basis to look for relationships between these cultural features and the pregnant women's behaviors toward nutrition supplements, which will be examined in the next chapter.

## **2.2 Methods**

### ***2.2.1 Study population***

Matlab is a rural area within a sub-district of Chandpur of Bangladesh. The population is 500,000 and located 51 km southeast of the capital, Dhaka. Residents of Matlab are primarily engaged in farming or fishing. The predominant religion of the residents is Islam, followed by Hinduism. Since 1963, Matlab has been a principal research site of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B.), which has provided about a half of the sub-district's residents with clinical and public health services including Maternal and Child Health and Family Planning (MCH-FP) program <sup>138</sup>. In particular, malnourished pregnant women in this area whose body mass index (BMI,  $\text{weight (kg)/[height (m)]}^2$ ) is lower than 18.5  $\text{kg/cm}^2$  have received food and micronutrient supplements through the National Nutrition Program (former Bangladesh Integrated Nutrition Programme, BINP) since late 1990's <sup>139</sup>. In addition, from 2001 to 2004, the majority of pregnant women in this area participated in a prenatal nutrition supplementation trial, called Maternal and Infant Nutrition Interventions in Matlab (MINIMat), regardless of their nutritional status <sup>118</sup>.

### ***2.2.2 Selection of informants***

Thirty women, who were pregnant or newly delivered, were randomly selected from the

Demographic Surveillance System (DSS) of the ICDDR, B for this study that was conducted for a three-week period during July, 2009 in Matlab. Only multiparous women were considered for this random selection of interviewees to increase possibilities that the selected informants had had previous experiences with MINIMat. Out of the four specified serving locations (called 'Blocks') of ICDDR, B., only the closest two blocks, 'Block A' and 'Block B', were considered for sampling as the rainy season made it difficult to reach women who lived further away. Among the selected women, only 24 were included in the study because one did not have any demographic records, one was selected twice, one had a stillbirth, two women had abortions, and one experienced a neonatal death. The age range of the women was 20 to 38 years. Twelve women had two children, six had three, and six had four and more. There was one woman each in the first and the second trimester, 13 in the third trimester, 8 who had delivered within a month, and one who experienced a spontaneous abortion. Each woman was located based on the name of her neighborhood, *bari*, the name of the head of her household, and information from her community health worker (CHW), who visited the household monthly to collect information on health and demographic indicators <sup>118</sup>. Out of 24 women, 22 had participated in the MINIMat study during her previous pregnancy, one was excluded from the study, and one did not participate in any nutrition supplementation program.

### ***2.2.3 Data collections***

#### **2.2.3.1 Interview guide**

An interview guide was developed to provide a participant with an opportunity to share opinions and experiences on her pregnancies freely (see Appendix 1.1). Inasmuch as it served as a guide and not a structured questionnaire, the guide was composed of a few 'grand-tour'

questions <sup>117,140</sup> on the main topics and subsequent follow-up questions that could be used as potential probes <sup>140-142</sup>.

Guide questions covered the following issues: experiences about previous and current pregnancy; general concerns, worries, and/or problems during pregnancy; delivery experiences; practices performed for healthy and safe pregnancy; family member's role or interactions with regard to pregnancy; dietary intake during pregnancy; and experience with nutrition supplements. Initial guide was revised several times to ensure the questions were open-ended and comprehensive enough for the interviewees to reveal their own experiences and opinions. The field supervisor also reviewed the questions to make them culturally acceptable. Once the guide was finalized, it was translated into Bengali. Then a native speaker translated it back into English to assure that each question was aiming at what was intended. All interview questions in both English and Bengali version and the process recruiting and interviewing were approved by the Institutional Review Board (IRB) at Cornell University (Protocol ID #: 0904000352, May 27, 2009) and Ethical Review Committee (ERC) of the ICDDR, B (Protocol #: PR-09029, June 22, 2009).

#### 2.2.3.2 Training of the interviewer

A field research assistant, who was a Bangladeshi and spoke English, had studied anthropology at a graduate level and had several field experiences, was hired for the interviews. A training session was held in Dhaka before going to the field site. The main topics of the interviews along with the purpose of the entire study were introduced and all interview guide questions were reviewed comprehensively until the assistant became familiar with the questions. Intensive discussion sessions were followed after each of the first two interviews was finished to assure that each question was administered appropriately and the women's responses were

comprehensive enough. The flow of questions and probes were modified to promote more favorable conversations to elicit women's thoughts.

#### 2.2.3.3 Actual interviews

After locating a woman, which was the most time-consuming step in the field work, oral informed consent for interviewing was obtained from the woman (see Appendix 1-2). If necessary, permission was sought from family members, usually from mother-in-law or husband. Although it was a rainy season, all selected women were reached and participated in the interview.

In-depth interviews were conducted in a private place in each woman's house. When other people entered in during the interview, which occurred frequently, they were asked to leave the room or place. Each interview took approximately one hour. The trained research assistant conducted all interviews in Bengali and the principal investigator joined the interviews as an observer. Women's answers were probed to elicit more information whenever necessary. The majority of the women were shy in answering questions but willing to participate in the interviews. A maximum of three interviews were conducted in one day, one or two in the morning and one in the afternoon. A discussion session between the research assistant and the principal investigator followed after finishing interviews for the day and minor modifications in the guide questions were made to obtain information that was vague or needed more details.

All interviews were recorded after obtaining approval from the interviewees and saved as MP3 files. After each interview, a small pouch was given to the women as the appreciation of their time and efforts committed for the interview.

## **2.2.4 Data analysis**

### 2.2.4.1 Transcriptions and translations

Interviews were transcribed verbatim in Bengali by a few staff members from ICDDR, B. Each transcript was compared with recordings by a third person not involved in the transcription process. Then the transcripts were translated into English by a hired person who had experiences in preparing translations from Bengali to English. The field research assistant helped the transcription and translation. To assure their quality, English translations were also checked by another person who did not work on either the transcription or translation. Many women responded to questions fragmentarily and did not speak in full sentences. As a result, some narratives were hard to understand when translated into English.

### 2.2.4.2 Grounded Theory

Grounded theory, as the name indicates, is a method constructing a theory based on the data collected for a particular study<sup>113,117,141,143</sup>. Inasmuch as the main purpose of this ethnographic study was to learn the perspectives of pregnant women in Matlab about their culture, the analysis was conducted based on the grounded theory<sup>117</sup>. Inasmuch as there was no *a priori* idea<sup>141</sup> about cultural beliefs, attitudes, perceptions, and practices of pregnant women in the study area, all transcripts were read repeatedly to identify themes that emerged from the interviews. Then themes that emerged were described to illuminate the women's perspectives regarding the cultural features during pregnancy<sup>143</sup>.

### 2.2.4.3 Text analysis

Text analysis was carried out with ATLAS.ti v6.2. A total of 639 codes were created based on the responses of interviewees regarding pregnancy-related cultural beliefs and



practices, attitudes, perceptions, concerns or worries, health risks, dietary patterns, influence of family members, and nutritional supplement use. Relevant texts from the interview transcripts were coded while the iterative process of creating and assigning codes was being continued. All codes were grouped into bigger categories and analyzed using the grounded-theory approach to identify emerging themes<sup>141,143,144</sup> associated with cultural features related to pregnancy in the population. For each dominant theme, with which codes that seemed to be potentially associated, was examined separately. Then sub-themes were identified. Within each sub-theme, the relationships among codes were analyzed to provide contextual and socio-cultural background for explaining culture-bound beliefs, attitudes and behaviors specific to the pregnant women in this rural area of Bangladesh.

## **2.3 Results**

The dominant themes from the analysis were fear, delivery-related concerns (or worries), and the unique cultural-social context of pregnancy, including taboos, changes to dietary patterns, and family influences on the pregnant women. Culture-specific beliefs, attitudes, perceptions, and practices are embedded in these themes, which also set boundaries for women's attitudes and behaviors during pregnancy.

### ***2.3.1 Fear***

Fear was the most salient theme that emerged from the interviews. Fear appeared to be associated with many different features of pregnancy, and it seemed that women were surrounded by fears generated from various sources throughout their entire pregnancy. Death was the primary fear for the women, particularly the death of their babies and their own deaths.

#### 2.3.1.1 Maternal death

Pregnant women feared death from adverse events during pregnancy. Particularly, the time of delivery was the most concerned. This was because participants thought pregnant women were to be vulnerable to problems during delivery, including obstructive delivery, breech birth, excessive bleeding and other unexpected problems that could result in maternal deaths; hence they feared death more than anything (see Appendix 2.1.1). Although the interviewees thought that detrimental events could happen to any mother without any preceding signs, there were potential conditions considered to be closely associated with the deaths of mothers: physical weakness, anemia, Allah's will, and *Alga's* attack.

##### 2.3.1.1.1 Physical weakness

Many women experienced physical weakness during pregnancy. Though some women considered feeling weak as a general symptom or a condition associated with morning sickness that appeared in early pregnancy, many women mentioned weakness in relation to pregnancy-associated worries and problems and even maternal death (see Appendix 2.1.1.1).

Women perceived that weakness of their bodies possibly reflected an undesirable health status, which could result in weakness in the baby. For example, a woman said, "If I eat more, I, myself, will remain healthy and, also baby will remain healthy. If I eat less, I will become weak, and baby also gets weak. That's it" (Interviewee 11). This also shows the perception of a direct connection between the mother and the fetus. Particularly because weakness in a baby appeared to be associated with subsequent health problems, mothers wanted to prevent it by keeping themselves from becoming physically weak.

Physical weakness was often contrasted to physical strength and energy, which were considered necessary for a good pregnancy and healthy babies. Physical tiredness appeared to be

closely related to the weakness. Heavy work, getting old, experiencing multiple pregnancies and having insufficient nutrient intake were also mentioned as potential causes of weakness in the mothers. Interviewees also reported that they experienced sudden pains, restricted mobility, and dizziness as a result of weakness (see Appendix 2.1.1.1).

In addition, anemia and low blood pressure were thought to be associated with physical weakness, such that women believed that they needed to take iron tablets as a remedy for their weakness. Moreover, physical weakness was regarded as a severe problem that required hospitalization or even predisposed a woman to death during delivery. “Baby may have problems. [I] feel weakness. Mother may die” (Interviewee 26). “What if I die...[I think this because] I am so weak. So, I felt tensed” (Interviewee 35). (see Appendix 2.1.1.1).

Therefore, the women were asked by family members, community members, community health workers, and even health professionals to stay strong and healthy throughout their pregnancies. This led the women to adopt strategies for maintaining strength and energy: consuming more foods, taking nutrition supplements, and seeking medical treatment (see Appendix 2.1.1.1). As dietary intake was frequently mentioned by the women in relation to their physical status during pregnancy, advising women to increase their food intakes during pregnancy appeared to be a feasible and persuasive way to address the issue of feeling weak.

#### 2.3.1.1.2 Bleeding and anemia

Blood was one of the words mentioned repeatedly by the pregnant women. Clean blood (or pure or purified blood) and producing blood (or creating blood) were the two main blood-related issues perceived as good for pregnant mother. Interviewees recognized several benefits of clean blood or the production of blood: “[People] Say blood is purified. Baby will be good and it will be good for body” (Interviewee 13). ; “I get a little physical strength that’s it...Produces

blood... It is said that if it (iron pills) is taken, it produces blood in the body, then body becomes strong, that's it" (Interviewee 12). The interviewees mentioned that they believed that their bodies would be strengthened and stay healthy if they produced more blood, which was also believed to make the baby healthy (see Appendix 2.1.1.2).

Some believed that taking iron supplements would make the delivery easier, treat anemia, prevent diseases, and remove dirt from their blood by producing or cleaning it. Women also mentioned that these perceptions were shared with other family or community members because most people thought it would be good for pregnant mothers to take iron tablets for their babies (see Appendix 2.1.1.2).

Some were also concerned about their blood pressure. As it was routinely measured during hospital visits, the mothers recognized their blood pressure-associated problems relatively well; both hypertension and hypotension were considered undesirable. Women expected to solve problems with blood pressure, particularly hypotension, by taking iron or vitamin supplements (see Appendix 2.1.1.2).

Moreover, although interviewees mentioned different types of symptoms that they experienced during pregnancy (such as headache, fever, gastric problems, edema, sudden pains, typhoid, and uterine problems), only bleeding and anemia were described in relation to the fear of death. Bleeding during pregnancy was often perceived as a sign of miscarriage or preterm birth. In contrast, bleeding during or after delivery appeared to be associated with more serious problems, including fetal or maternal death as in the case of a mother who shared her experience:

I feel weak, and am suffering from low pressure and also suffering from anemia... What problem? Weakness, if physical condition is anemic then anybody can die... I feel tired, my sister-in-law died during the process of delivery. She was anemic and before blood was transfused, she had succumbed to anemia... She was anemic, there was a lot of bleeding during the birth process. Even after transfusion, she did not make up and died (Interviewee 6).

Anemia was perceived as an underlying cause of death, particularly when there was massive bleeding during or after a delivery (see Appendix 2.1.1.2). As for treating anemia, taking iron tablets or vitamin pills and eating more food (particularly iron-rich food; for example, *aurum* leaf or spinach-*kachu*, sweet gourd, *lal* and *pui*) were mentioned (see Appendix 2.1.1.2).

#### 2.3.1.1.3 Allah

Allah was the God to whom pregnant women turned to. Allah was considered to be deeply involved in pregnancy and birth in many ways, all of which seem to be grounded in the belief that Allah has the authority to make decisions for everything including birth and death. People perceived a baby as a gift from Allah, which became a reason for forbidding abortions. They thought the gender of a baby would be determined by Allah as well (see Appendix 2.1.1.3). Interviewees also mentioned that a woman could maintain favorable conditions throughout her pregnancy by the grace of Allah. Vomiting (or morning sickness), pain, fear, anxiety, worries, and having other problems were avoidable thanks to Allah. The position of a fetus was also believed to be determined by Allah. Even the food available to these women was thought to be determined by Allah's will.

The role of Allah was even more prominent when women expressed their concerns regarding delivery. In general, the women believed that safe or successful delivery could be ensured by Allah. Although doctors would take care of delivery processes, they thought that the delivery itself was guided by Allah, and even that the time and the place of delivery would be determined by Allah's will (see Appendix 2.1.1.3). It was particularly seen that having a normal (or vaginal) delivery was the result of Allah's blessing. The women hoped to avoid difficult deliveries, such as a breech, obstructive, or a cesarean delivery. Allah was believed to make the delivery smooth and easy, without other potential problems. Maternal death was also believed to

occur by Allah's will, hence the death was not predictable or preventable (see Appendix 2.1.1.3).

As Allah's will was perceived to have such a significant influence on pregnancy and its outcomes, pregnant women practiced various ways to intervene, such as pleading to Allah by praying and giving offerings (*Namaz*) or fasting, hoping to avoid potential dangers or harms during their pregnancies. Their prayers focused heavily on delivery-related issues and birth outcomes, especially healthy babies, which might imply not only that they were concerned about these the most but also that they could not do much about these except to accept the consequences given to them by Allah (see Appendix 2.1.1.3).

#### 2.3.1.1.4 Alga

*Alga*, a supernatural being, appeared to have close associations with potential dangers during pregnancy, including the deaths of mothers. As it is an evil spirit known to affect pregnant women by contacting them through its wind, *Alga* was given several different names, such as *Alga batash*, *kharap batash* (meaning bad wind), *Alga talga*, *Alga tol*, *Bhut* (meaning bad fairy), Jennies (meaning demonic energy), bad air, external wind, wild wind, whirlwind or jungle wind.

*Alga* was believed to attack almost everyone and make them insane or sick. But pregnant women were the preferred targets and the most frequently affected by *Alga*, which resulted in time- and place-specific cultural practices. *Khen* was a unique time-related rule mainly applied to pregnant women: pregnant women should not go out of their houses and walk around in the early morning, at noon, and in the evening to avoid the risk of touching the wind of *Alga* (see Appendix 2.1.1.4). According to one woman, she was not even allowed to go to the bathroom during these times, and another woman said that if a pregnant woman needed to go out, she had to wait until the time passed or asked another person to go instead of her.

Everyone follows it. At noon [I didn't go out]. At around *Zumma* (12.30 pm). That

time *azan* is announced, then again at night. Again, if one has the pressure for toilet during the *Fazr* time (4 a.m. -5 a.m. in the morning), she cannot go there (Interviewee 4).

Certain places were believed to be dangerous according to *Khen*. Pregnant women were not supposed to go to or pass by bad places, such as graveyards, wild places in swamps, ponds, and bamboo bushes, because of a potential attack of *Alga*. One woman mentioned that pregnant women were not allowed to go through bad places and needed to have at least 45 hands of distance from them according to the rules of Islam, which implies that the *Khen* practice was combined with their religious practices (see Appendix 2.1.1.4).

In addition to maternal illness and death, the most dreaded consequences of contact with *Alga*, there were also harms related to the fetus, including anomaly, miscarriages (or fetal deaths), and stillbirths. Inasmuch as violation of the cultural rule was perceived to be detrimental to both the mother and the baby, the majority of the women seemed to make an effort to follow *Khen* and some were even forced to keep it by their family or community members even though they did not believe in *Alga* and its impacts. Women also suggested strategies they could adopt to prevent being influenced by *Alga*. They could wear a *tabiz* (a pendant believed to protect the person who wears it) or carry an amulet (or a talisman), usually provided by Ayurvedic physicians or traditional healers, called *kobiraz*. The *tabiz* or amulet was used as a curative treatment after contact with *Alga* as well. In addition, women believed that they would be safe if they carried lights or they were accompanied by someone when they went outside in the evening.

In summary, fear associated with maternal death, was repeatedly expressed by the pregnant women in this rural area of Bangladesh. Physical weakness and anemia were perceived to foreshadow the risk of death to the mothers, and Allah and *Alga* were believed to have decisive roles in maternal death. Although the majority of the women seemed to accept their

fates passively as given to them, pregnant women sometimes adopted strategies to prevent detrimental outcomes or to appeal to the omnipotent entities. These resulted in various pregnancy-related practices: keeping their mobility to a minimum, keeping the cultural rule of *Khen*, increasing food intake, taking iron supplements, and practicing religious activities such as praying, offering, and fasting.

#### 2.3.1.2 Fetal death

Women expressed their fear of fetal death and hoped to have healthy babies and avoid unfavorable birth outcomes. As in the case of maternal death, women were afraid of the delivery more than other periods of gestation, as it was thought to be the most dangerous time for babies. One woman said,

[I] Think what will be born, how it will be born. People now fall in trouble when baby is in the womb.... Danger means when a baby is born, anything [can] happen. If these thoughts come, someone becomes sleepless. At times a baby dies also, children are there, so many things come in thinking” (Interviewee 15).

The fear of fetal death was also elicited in relation to the fetus’ movement during pregnancy as a few women said that if they felt the fetus was moving less than usual, they were worried about fetal death. For instance, one woman said,

If the baby moves a little, I become upset. I think why it does not move. But the time when it moves more, I feel comfort. I become afraid when it moves a little. I become afraid by thinking that if anything has happened to the baby and why it is moving less. Is not there any fear? Suppose if the baby in my womb does not move, there is a problem. There is a possibility of death of the fetus (Interviewee 9).

People believed that a baby’s health depended on the health of the pregnant women, thus maternal status would directly affect the growth and well-being of the fetus, hence birth outcomes. This belief was reflected in the potential causes of fetal death, such that certain behaviors of the mothers appeared to be closely related to the deaths of babies. Although there



were factors beyond the women's control, like Allah's will, and others, including *Alga's* attack, heavy work, careless movement, consuming certain foods, or taking medicines, were recognized as things possibly to be controlled and avoided by mothers to prevent fetal deaths (see Appendix 2.1.2).

As in the case of maternal death, Allah was believed to have a critical role in fetal deaths as expressed by a woman saying, "Pray to Allah so that Allah gives a healthy baby. Always pray. For myself, pray to Allah so that Allah takes a danger away in stride and also that I do not have a danger as well as the baby" (Interviewee 13). Given the mothers believed that a baby's health and risks at birth, life, and death were determined by the Allah's will, they would turn to Allah for help in avoiding potential risks of losing their babies and for help in having a healthy baby (see Appendix 2.1.2).

The perceived role of *Alga* in fetal deaths appeared much stronger than it was in maternal death; bleeding during pregnancy, miscarriages, and fetal deaths were mainly attributable to *Alga's* attack. As pregnant women believed that violating cultural norms, going out at noon or at night or going to bad places, would provide the *Alga* with chances to contact her and kill the fetus, this belief was powerful motivation to follow strictly the cultural restrictions on their movements (see Appendix 2.1.2).

Heavy work was mentioned as one of the main causes of miscarriage. In general, too much heavy work was considered harmful for the mother and the baby, and hence needed to be avoided during pregnancy (see Appendix 2.1.2). Therefore, most pregnant women seemed to try to limit their work to light duties, but there were women who still had to carry out their heavy duties as a participant described, "Now I am telling mother [in-law that] I am not feeling well and will do it later. Then she doesn't like it very much. My mother-in-law is also good ....She

doesn't want to do any job and wants me to do all work" (Interviewee 7).

Pregnant women were not allowed to take powerful medicines, such as pain killers, fever reducers, and allergy pills, because of possible detrimental effects on the fetus, including death. Eating pineapples and running were also mentioned as potential risks leading to fetal deaths (see Appendix 2.1.2).

Although the women showed passive attitudes toward their own possible death because of the very limited controls over delivery processes they had, they appeared to take more active roles in preventing fetal deaths. Particularly those women who had previously experienced a fetal loss sought medical care throughout their pregnancies to ensure the safe delivery of their babies in addition to abiding by various cultural proscriptions (see Appendix 2.1.2).

#### 2.3.1.3 Abnormal birth outcomes

Along with maternal and fetal deaths, women were also afraid of having babies with abnormal conditions. In general, "doing harm to the baby", mentioned considerably during the interviews, might mean anything from poor health to death, but the women did not always mention the particular type of harm they meant. But anomalies of babies were specifically referred to as a baby who was disfigured, blemished, handicapped, abnormal, spoiled, disabled, or one with defects (see Appendix 2.1.3).

Factors perceived as causing anomalies in babies were very similar to those for fetal death: Alga's attack, heavy work, taking powerful medicines, and eating certain kinds of food, especially pineapples and specific types of fish were potential causes, hence pregnant mothers avoided these. Allah was also perceived to have the power to give healthy and wholesome babies to mothers by playing a critical role in the delivery processes or birth. But other causes for abnormal births were also mentioned, such as a breech delivery, malnutrition, and

consanguineous marriage. Women worried that the brain could be damaged in the case of a breech delivery or malnutrition of the mother. A marriage between relatives was perceived as a risk factor for having a baby with a handicap (see Appendix 2.1.3).

Additionally, although it was not as serious as anomalies, the mothers were concerned about a baby's general health. Small, weak, and/or unhealthy babies were thought to be problematic. Even those women who previously had healthy babies were anxious about the health status of their fetuses.

### ***2.3.2 Delivery-related concerns***

In addition to fears, pregnant women often expressed concerns or worries about pregnancy-related issues. Although the mothers revealed various concerns, including biological or economic status and social matters, the majority of them seemed to come down to delivery-related issues: having a big baby, a cesarean delivery, an episiotomy and the place of delivery.

#### **2.3.2.1 Big baby**

'Eating down' is a prevalent practice among pregnant women in South Asia to avoid potential complications during childbirth, including obstructed delivery and even maternal death<sup>93,94</sup>. Mothers in this rural area of Bangladesh were also familiar with the practice of 'eating-down' during pregnancy and the potential problems associated with having a big fetus. One mother said, "Again, [for those] who can eat more, their baby become fatty. It is a problem at the time of delivery... Many of them say that if you eat too much, baby will be bigger. So that will be troublesome at the time of delivery" (Interviewee 12). Not all women seemed to practice it, however, either because they did not believe it, or they considered it just a belief of older generations. A participant said that,

Previously, people used to say like this.... Earlier people say (voice wanes), during the time of our mother and aunts. If anybody took more food, the size of the baby would be larger. Baby would be damaged at the time of delivery. Mother would feel uncomfortable, too. Mother would be sick, they said like that. And these days, [people] say [that] taking more food. This will keep the baby healthy. Mother will remain healthy (Interviewee 6).

The big-baby belief was not strong enough to make them restrict their food consumption in this area because there seemed to be confusion about the belief among the women. Some of them mentioned a completely opposite belief, saying that if a mother ate a lot, the baby would be small due to the lack of space for the fetus to grow and this small baby would cause problems during delivery. For example, a woman said, “People, the seniors told that if a mother took more food, then her fetus remained better. If she took less [food], then fetus would be big in the size....[If the fetus remains small in the size,] it would be easy during the delivery time” (Interviewee 20).

With regard to the potential consequences of having a big baby, mothers said they would have problems in delivery even though they did not explicitly mention any specific negative consequences such as obstructed delivery or maternal death. But women stated that mothers were concerned about a cesarean delivery or an episiotomy as a result from having a big baby (see Appendix 2.2.1).

Moreover, some women preferred a big baby to a small baby, as was the case of one woman who said,

Someone who eats a lot, her baby will be strong and healthy. Mother will be well and her baby will be good in health, if [she] eats good food... There is no one to follow this rule here. Mother will be strong. Mother will not be weak. Baby will be good and strong... I did not follow this rule (Interviewee 26).

Many thought that a big baby meant a healthy and strong baby, which also may have weakened the practice of ‘eating-down’ and led these women to increase food consumption during their

pregnancies (see Appendix 2.2.1).

Thus, although eating-down to avoid a big baby was a well-known belief, it appeared to be less influential to pregnant women than expected in the study area. Rather, behavior changes related to food consumption were mentioned more strongly with other factors, such as appetite and food availability, that will be discussed later.

#### 2.3.2.2 Cesarean delivery and episiotomy

Pregnant women preferred to have a vaginal over a cesarean delivery. Among the various concerns associated with cesarean delivery, the high cost of delivery was what most worried pregnant women. As one woman expressed in her interview, “Then I thought that the worst condition. I did not have that much money. The child had not come yet. I did not feel any pain. Where I had to go... If a cesarean was needed, how I could manage a lot of money. That’s why I felt worried” (Interviewee 2). It was also mentioned that a woman who had a cesarean delivery would need more time to recover after a birth (for example, three months without performing any heavy work to avoid undesirable consequences). As a woman was expected to be back to work soon after her delivery in this region, the long recovery period after a cesarean delivery appeared to put women in a difficult situation (see Appendix 2.2.2).

Women revealed potential conditions that could lead to a cesarean delivery as well: a prolonged labor, an overdue delivery, a big baby, and an abnormal position of the baby. As women were not able to control these situations, however, they only expressed their worries while coping strategies were not mentioned actively. Moreover, there seemed to be a suspicion that doctors would make the decision to perform the cesarean delivery easily and a cesarean delivery might be a trick of the doctors because they would obtain monetary benefit from it (see Appendix 2.2.2).

In addition to the cesarean delivery, pregnant mothers were concerned about episiotomy or tearing during delivery. Again, they worried about expenses they would have to pay for episiotomy (or 'side scissor'). Some women perceived that they had to experience episiotomy because their babies were big (see Appendix 2.2.2).

Although they were not considered dangerous, cesarean delivery and episiotomy were the concerns of pregnant women because they were not perceived as normal delivery procedures. As these were performed at hospitals, the expenses the women had to pay created additional concerns. In the women's thoughts, having a big baby appeared as a common reason for cesarean delivery and episiotomy.

#### 2.3.2.3 Delivery places

Another issue the pregnant women raised in relation to a delivery was about birthing places. Women revealed three different places they could choose for their deliveries, including home delivery by midwives and a delivery at a sub-clinic center or a hospital. Women with serious conditions were sometimes referred to hospitals from sub-clinic centers, but some directly went to the hospital run by ICDDR, B. in Matlab for their deliveries. It was easily observable that the department of obstetrics and gynecology in ICDDR, B. hospital was crowded with women for antenatal care visits and few beds were available because of mothers who were in labor or had just delivered a baby.

Whether they had given birth at home or at a hospital previously, the majority of women preferred hospitals to their homes for the delivery of their fetus. This was primarily because they thought hospitals were prepared for unexpected problems, and thus would be safer places to deliver a baby than home. The mothers mentioned that there would be fewer problems with bleeding if they could deliver their babies at a hospital, and they also expected that complicated

births, including having a breech baby or a prolonged labor, could be handled properly at hospitals. Women viewed medical professionals, staff, and medical facilities and equipment as enabling components for a safe delivery. Their intention to avoid some cultural procedures performed at home for delivery was another reason for women to choose hospitals over their homes as said by one woman,

If a baby is delivered at home, a lot of rules [I] have to follow. [People] Do not allow eating fish, do not allow eating hot food, [and I] have to eat selectively. If deliver [a baby] at hospital, [I] don't have to follow such rules. In hospitals, [people] tell [me] to eat everything. This regulation applies at home, but there is none in hospitals (Interviewee 14). (see Appendix 2.2.3)

Some also expressed their concerns with home delivery processes performed by a midwife because it could lead to adverse consequences including infection, pain, bleeding, tearing, and injury, as one woman mentioned:

On the other hand, if one delivers her baby at home, midwives are there. But, they are ignorant. They are not trained properly. That's why I planned to deliver at hospital. There can be many types of problems. They can have longer nails, which are dirty sometimes. When they put their hands inside and touch the uterus with the dirty nails, those can harm the baby or the mother as those nails carry germs (Interviewee 19).

In contrast, hospitals were recognized as being hygienic, hence were considered to be a better environment than the home. Moreover women who had undesirable experiences with home births showed a strong intention to have a hospital delivery. Also it appeared that those women who learned about a hospital delivery from antenatal education became in favor of a delivery at a hospital (see Appendix 2.2.3).

Not all people, including family members, however, favored deliveries at hospitals. In particular, some husbands or mothers-in-law had different thoughts regarding seeking medical cares for a delivery. A woman said that as her mother-in-law had not received any medical assistance, she, the daughter-in-law, was not supposed to have doctor's assistance: "She used to

pick quarrels with the doctors or whoever tried to help me. She said that all those people have made me spoilt. She had also given births but she didn't receive any assistances. So, I also should not receive any" (Interviewee 18). Another woman said that her husband did not permit her to seek a hospital because he thought doctors were not required: "My husband said not to go to the hospital. [I told him] Doctors said [it] for the betterment of baby and for me. My husband said that my wife would stay at home. [He thinks] Doctors are not required. I tried to make him understand. But he does not have any senses" (Interviewee 26).

In summary, most of women interviewed preferred hospitals for their deliveries because hospitals were thought to be safer and better than home for births in dealing with possible complications in deliveries. Interestingly, they did not mention any economic concern regarding expenses for their deliveries at a hospital, while they were worried about the cost for cesarean delivery and episiotomy. Previous experiences and antenatal educations influenced these women's attitudes toward a hospital delivery. At the same time, it would be difficult for the women to make decisions to deliver at a hospital when her family members had different thoughts about it.

### ***2.3.3 Culture-specific rules***

Pregnant women in Matlab described various culture-bounded behavioral guidelines they were asked to follow. Like the cultural norms and the religious practices women mentioned regarding *Alga* and Allah associated fears, they had many do's and don'ts to avoid undesirable consequences of the mother and the baby.

#### **2.3.3.1 Do's**

Generally women were told to consume nutritious food during pregnancy. Proper food,



good food, and right food were also used to describe food appropriate for pregnant women. Fruits and vegetables were commonly recommended as nutritious food because these were thought to be vitamin-rich. Specific food items were also mentioned: milk, egg, pomegranate, jack fruit, apple, grape, orange, *safeda* (a local vegetable), sweet gourd, spinach-*kachu* (*aram*), *lal*, *pui*, and other green leafy vegetables. Most of these were considered to make babies and mothers healthy and some of them were consumed because they were iron-rich: “I ate vegetables, such as some types of spinach-*kachu* (*aram*), *lal* and *pui* etc. To get nutrition. Nutritious food makes blood. Anemia goes away” (Interviewee 25). Sweets were also recommended for pregnant women because some people believed sweets would keep the brain cool or sharp: “Here, there was a saying that if someone takes sweets during pregnancy... Brain of the fetus would be sharpened... Say, sweets keep the brain cool” (Interviewee 6). Likewise, these women also believed that milk would make a baby’s skin lighter: “And they used to advise for taking milk...What would be resulted from taking milk? The baby would be lighter skinned” (Interviewee 6). (see Appendix 2.3.1)

Taking rest was another recommendation for pregnant women. These women described appropriate rest as sleeping or lying down for 5 minutes to 2 hours daily, especially after having a meal or doing tiring work or when feeling unwell. Family members and medical professionals appeared to give the same advice to these women, and pregnant mothers adhered to this advice hoping to protect their fetuses (see Appendix 2.3.1). Other things pregnant women were asked to do included keeping their bodies clean, reading the Quran, and seeking hospitals whenever they felt bad to prevent potential adverse birth outcomes (see Appendix 2.3.1).

#### 2.3.3.2 Don’ts- Prohibiting heavy work and restrict certain foods.

As briefly discussed in the previous section, dangerous work or heavy work was not

recommended for pregnant women to protect the well-being of the mother and the baby.

According to pregnant women, the kinds of work they should not do included carrying heavy items like water buckets or jars, a bag of rice, firewood, mud or soil, and paddy sacks; working in paddy fields; washing heavy clothes or big cookers; sweeping or cleaning the house; making over the floor with mud; and even traveling a long distance. People believed that these types of heavy work would cause various harms to their fetuses (see Appendix 2.3.2).

A woman said heavy work would result in an abnormal position of a baby: “It may harmful for the fetus. The baby may be placed aside. The mother gets pain, and the mother cannot stand up. If she does heavy work, baby can get out from the uterus. Baby’s hand or foot may come outside from the uterus” (Interviewee 26). Another woman said heavy work would damage the fetus: “It may cause problems to my fetus. Uterus may come down and harm fetus. It may break the chest of the baby” (Interviewee 25)

Also as potential consequences of heavy work, premature birth, putting pressure on a fetus that could lead to a miscarriage, and weakness in the baby were mentioned. Pregnant mothers also thought that they would be influenced by heavy work and would have symptoms such as pain, bleeding, uterine problem, weakness of uterus, and fatigue (see Appendix 2.3.2). Although the majority of the interviewed women were able to avoid heavy work during their pregnancies, there were some women who still had heavy work as their responsibilities and expressed difficulties in carrying out what was asked to them. As one woman said, “Who else can do this work? I do all the work. I use a small rice pot what is convenient for me. Because there is no other ways, I will have to do” (Interviewee 26). Those women who did not have any support from family members seemed to have the burden of heavy work. Interestingly, as many mothers-in-law thought that pregnant mothers would be able to carry out heavy work as they had

done during their own pregnancies and some daughters-in-law seemed to be urged to do household chores regardless of their conditions during pregnancy. But there were some women who were able to share household responsibilities with their family members as well. In these cases, husbands appeared to help their pregnant wives and other female members including mother-in-law, daughters, and aunts were also mentioned as helpers (see Appendix 2.3.2).

Certain food items were restricted for pregnant women. Pineapples were strongly proscribed because it was believed to cause miscarriage. For example a woman said, “Pineapple is not eaten when baby is in the womb... Elders restrict [eating it]. That’s why didn’t eat [it]” (Interviewee 10). Some women mentioned chili would make a baby bad-tempered: “Chili. Taking chili would harm the fetus... If you take chili, the baby becomes stubborn” (Interviewee 6). Some said they avoided fish, coconut or tamarind to prevent damages to fetuses, mostly related to personal characteristics and appearance. In the case of fish, touching raw fish was prohibited as well.

But there were many women who did not have any proscriptions of eating. Many of these women revealed that they could not eat what they wanted to not because of cultural taboos but because of lack of food. They also said that they would even consume pineapples if available (see Appendix 2.3.2).

Pregnant women were also advised to move carefully. This guideline included both restrictions of women’s movement in the environment and cautions for their own bodily movements. In relation to the former, women were asked to abide by not only *Alga*-associated prevention of not going out at noon or in the evening, but also a general rule of not going far from their houses. Restrictions associated with bodily movements included being cautious about their body whenever they move, not running, or walking briskly. Often women did not

differentiate these two types of restrictions and mentioned both types of restrictions together as indicated by some women: “Starting from becoming pregnant. One must hide her head with cloth and must be more cautious about her movement... Any pregnant woman should follow the rule about when to move or how to move. And she has to maintain the timing also” (Interviewee 4).

Women said that they did not go out to avoid potential harm such as an injury from falling down or an unexpected accident. Also, not being in front of other people, especially males, was another reason not to go out from the houses. Using transportation to go a place in the distance was considered dangerous as well. “She (mother-in-law) said not to go out, to walk slowly and little, and not to go in front of others. It is a matter of shamefulness because there are many male people. It is a matter of shamefulness. For this, she said to walk less” (Interviewee 9).

By following these rules, women expected that a baby would remain in the right position and in good condition, and eventually that they would have a baby without any problem (see Appendix 2.3.1). It also appeared that family members restricted these women’s mobility and many women needed to get permission from their family members to go out.

In sum, for better birth outcomes, pregnant women were told to follow cultural norms, do’s and don’ts, in this area of Bangladesh. Interestingly, both do’s and don’ts centered on food consumption and women’s actions during pregnancy: Nutritious foods, thought to be rich in vitamins, and cautious movements were recommended; Mobility was tightly restricted particularly to prevent detrimental consequences like a miscarriage. Pineapples and fish were main food items prohibited during pregnancy and many of proscribed foods were believed to be related to a baby’s personality or appearance.

### ***2.3.4 Family's influence***

Family members appeared to be actively involved in various issues associated with pregnancy. Generally family members cared about pregnant women's behaviors because of the perception that birth outcomes were closely related to mother's behaviors during pregnancy. In addition, the concerns of households, particularly the economic status of the household, influenced several features of pregnancy.

#### **2.3.4.1 Role of family members**

Family members influenced women in their pregnancies in various ways. Husband and mother-in-law in particular appeared to play important roles in setting boundaries for pregnant mothers' behaviors.

##### **2.3.4.1.1 Common roles of husbands and mothers-in-law**

Husbands and mothers-in-laws provided a variety of advice to pregnant mothers as illustrated by one woman, "My husband, parents, and father-in-law... They look after me whether I take food correctly or whether I take rest adequately" (Interviewee 7). Generally husbands and mothers-in-law asked the women to follow do's and don'ts, such as prescriptions and proscriptions about food consumption, taking rest, heavy work, and mobility. Particularly regarding women's mobility, which also closely related to the *Alga*-related behavioral practices, they not only advised but also had the authority to give permissions to the women. They also encouraged women to consume nutrition supplements, including micronutrient pills and food supplement packages. Particularly, it appeared that some women needed to get permissions from their husbands to go to a community nutrition center (CNC) to obtain food supplement packages.

Women also needed to get permissions from their family members about seeking medical

care or taking medicines. Mostly husband appeared to make decisions about pregnant women's going to hospitals for illnesses and even for their deliveries (see Appendix 2.4.1.1). The majority of women had a passive attitude, such that they tried to abide by what had been requested or suggested to them by family members regardless of their own understanding or beliefs. Actually some women were very determined to follow their husbands' words over other family members' as one woman stated, "Whatever husband tells, [I follow] that. Now I do not follow anyone and mostly remained with husband... I will abide by what husband says more... I am in his bondage" (Interviewee 11). There were women who took an independent position, however, stating that they would decide things for themselves and would not listen to anyone else (see Appendix 2.4.1.1).

Another role of husbands and mothers-in-law was to help pregnant women. Many said that either her husband or mother-in-law was the main caretaker because he/she was concerned about the pregnant woman's status throughout her pregnancy. Some women said that their husbands or mothers-in-law helped with household chores. Husbands more likely to help with heavy work while mothers-in-law shared house chores with their daughters-in-law. Some said that they acted as a comforter or a consoler when the women were afraid or worried about pregnancy-related problems (see Appendix 2.4.1.1).

#### 2.3.4.1.2 Unique roles of husbands

Bringing food home was a unique role of husbands in this area. It seemed that husbands appeared to take a charge of purchasing foods from the market as the person who was responsible for making money for the household. Actually, many women stated that their household income came solely from their husband's earnings, thus food available in their houses were also dependent on what husbands could bring: "I do what my mother says, but my husband

earns. We (my mother and I) don't have income. So, we have to do what husband asks" (Interviewee 4). "Now if this was in Husband's luck, [we] would bought fruits then would eat them. And if these are not there, then [we eat] whatever [he] gets. That's it" (Interviewee 11). For pregnant women, husbands seemed to bring special food items home, such as fruits, eggs, fish, milk, and vegetables; and they also encouraged their wives to consume what they brought (see Appendix 2.4.1.2).

As such, husbands also were responsible for purchasing medicines for their pregnant wives. They also made decisions about having another child and played a role as a peace maker between the mother-in-law and the daughter-in-law (see Appendix 2.4.1.2).

#### 2.3.4.1.3 Unique roles of mothers-in-law - Generational gap

Although many mothers-in-law appeared to be concerned about their pregnant daughters-in-law, they had a different perspective on several issues from those of the pregnant women, particularly in relation to workloads, eating foods, and seeking hospital care. In general, compared to the daughter-in-law's generation, mothers-in-law seemed to have performed more work, even some heavy work, during their own pregnancies as indicated by a woman, "Now if a baby is in the womb, [I] cannot touch any heavy things... [Mother-in-law] says laughingly that what a time has come *Bou* (daughter-in-law) does not work" (Interviewee 18).

Based on their past experiences, mothers-in-law had a high expectation of the household chores their daughters-in-law would do during pregnancy, which put pressures on some pregnant women to carry out more work than was recommended. Some mothers-in-law expressed their negative opinions regarding over-eating and nutrition supplement uses, based on their beliefs about big babies. But there were also daughters-in-law who regarded big babies and 'eating down' as the older generation's practices, which led them to ignore what their mothers or

mothers-in-law advised them to do:

About the whole program, the elders say that the nutrition packet makes the baby big inside the tummy if we eat it. So then it's difficult to have a normal delivery for that baby and it requires a scissor-surgery. It's a trick of them to have a scissor-surgery. They make the baby big inside the womb so that it cannot be delivered normally. It brings [monetary] benefits to the doctors. This is what the elder people say. And we think that if the baby is healthy inside the womb, then it will be healthy after it's born. It would not get sick. That's our opinion, but the elders say that the consumed nutrition packets make the baby big inside the womb (Interviewee 16).

As mothers-in-law had not had the kind of medical cares that their daughters-in-law could receive now, some thought medical assistances would be unnecessary in childbearing and childbirth, which conflicted with the pregnant women's desire to deliver their babies at a hospital (see Appendix 2.4.1.3).

Mothers-in-laws were also involved in the delivery processes. Mothers-in-law gave their opinions on delivery processes, especially for the place for the delivery, and also helped in the delivery in various stages. As a female who was living with a pregnant woman at the time of delivery, the mother-in-law's role appeared more important than that of other family members, including the husband (see Appendix 2.4.1.3).

#### 2.3.4.2 Family's concern – economic status

Among various concerns of families, the economic status of the household appeared to have a significant impact on women's lives during pregnancy. Many women expressed anxiety about the poverty of their households, which was mostly associated with husband's unemployment and/or a large number of family members. For example, a woman said, "What tension I had? My husband was unemployed at that time. I had two children. How would I educate them? Who would support maintain our family? My husband had no income. I had to think these" (Interviewee 9). (see Appendix 2.4.2)



Household poverty appeared to be closely related to the food available to the pregnant women. Many women mentioned that although they knew that they needed to consume food of good quality, they were only able to eat whatever food was affordable to them. Some women even stated that their situation was so critical that at times there was no food for family members. “*Apa*, really, we are in need. There is no rice and no *dal*. There is only need... There is need in my family. What should we eat?” (Interviewee 39)

Poverty also imposed constraints on the healthcare-seeking behaviors of pregnant women. As described in the previous section, women were worried about the types of delivery, specifically cesarean delivery, because of the high cost for it. As such, seeking a hospital for medical cares or even taking medicines seemed to be burdensome to those women who were suffering from poverty (see Appendix 2.4.2). Pregnant women did not mention any active approach they could take to resolve the household problems brought by poverty, however, only making a plea to Allah for assistances or improvement in their economic conditions (see Appendix 2.4.2).

In summary, family members, particularly husbands and mothers-in-law, appeared to play important roles in giving advice, making decisions, and providing cares for pregnant women, who also showed great dependence on them for many pregnancy-associated issues. The economic status of the household was another factor to limit pregnant women’s behaviors including food consumption and hospital-seeking behaviors.

### ***2.3.5 Dietary practices***

Lowered appetite was common among pregnant women in Matlab. Many of them seemed to perceive the reduced appetite as one of general symptoms of pregnancy, which was not limited

to early pregnancy and stayed throughout the pregnancy. For example, a woman in her eighth month of pregnancy said, “I used to eat more before becoming pregnant. But after being pregnant, I eat less. I don’t feel anything tasty, and that’s why I eat less” (Interviewee 5). As these women said that they consumed foods when there was any urge to eat or they felt hunger, lowered interests in eating led them to decrease their food consumption during pregnancy: “[I] Must eat according to urge to eat food... A person feels like eating when an urge is there. Without the urge, [I] cannot eat. [A person] feels [like] eating only when she has an urge for it” (Interviewee 14). “When [I] feel hungry, then [I] eat. If [I] do not feel [like], [I] don’t eat” (Interviewee 13). Pregnant women mentioned several reasons to have a reduced appetite. Some women thought that pregnant women tended to have small stomachs, which also contributed to reducing food consumptions by limiting the amount of food a woman could consume at a time during pregnancy. Feeling full as the fetus grew or after they ate bulky food such as nutrition supplements (*Pushthi*) was a reason to lose the desire to eat during pregnancy. There were women who became restless or uncomfortable after they filled their stomach as well. Finally morbidity was another reason made them feel less interested in food (see Appendix 2.5).

Most women ate less food than the amount consumed before being pregnant. Although family members and medical professionals recommended consuming more food, and pregnant mothers knew that they needed to increase their food consumption to be healthy, only a few said that they actually increased food consumption for the nutrition of their fetuses (see Appendix 2.5.1). There were women who increased the frequency of meals or snacks during pregnancy; but the total amount consumed was not necessarily increased:

I ate four times. But after became pregnant, I ate for 5 times. I felt hungry, so ate more. I ate more rice three times a day but the quantity was less. So I ate *muri*, *chanachur* every after a few moments. I ate less rice... Decreased. Rice...Quantity has decreased but the number of times has increased (Interviewee

25). (see Appendix 2.5)

Morning sickness, usually vomiting, was an important reason for the decreased food consumption during the first trimester. Although many women said that they were able to eat more after the vomiting symptoms disappeared, still quite a few of them could not increase their total food consumption throughout the rest of their pregnancies (see Appendix 2.5). Economic status was expected to be another factor affecting the decreased food consumption, as many women expressed their concern regarding food availability, but the pregnant mothers did not explicitly mention it in relation to the amount of food they consumed. Likewise, not many women stated that they reduced their food consumption to avoid having a big baby. Rather, the majority of them complained about a lack of desire to eat food, which resulted in the reduction of food intake (see Appendix 2.5).

With regard to the frequency of the meals, however, pregnant women reported that they usually ate 3-4 meals a day with a range of 2-5 times. Women described five time periods for meals: early morning meal, breakfast (around 10 am), lunch (either noon or around 2 pm), evening meal and night meal (around 8 pm). Generally, these women had lunch, night meal, and one of the morning meals, and they ate rice and various other side dishes including fish, meat, and vegetables. Evening meals were skipped more often than early morning meals. For evening meals, women ate rice or other light foods; early morning meals were mostly composed of light foods such as *moori* (or puffed rice or fluffy rice), biscuit, and bread. Light foods were also eaten 2-3 times a day, and these snacks were usually egg, fruits, such as apples and bananas, *moori*, biscuits, cookies, cakes or bread (see Appendix 2.5).

In sum, pregnant mothers seemed to have daily routines regarding meals but their reduced desire to eat appeared to result in decrease in actual food intake during pregnancy, which

was also affected by several conditions and not changed despite active encouragement of family members and medical professionals.

## 2.4 Discussion

The interviews with the mothers revealed many cultural and social features illuminating the experience of being a pregnant woman in a rural area of Bangladesh. Although some of the cultural perceptions, like mother-fetal connection, conformed to generally accepted pregnancy-related beliefs<sup>91</sup>, some were unique to this society.

Fear during pregnancy, one of the dominant themes emerged from the interviews, provides a good example how these themes are linked to cultural perceptions and practices and hence set boundaries of pregnant women's behaviors. Fear of maternal and/or fetal death and abnormality of the babies was a prevailing sentiment among the women, which served as an underlying motive to make people think about causes of death and possible precautions to prevent it. Similar to previous findings<sup>81,126,129,136,137</sup>, the women thought Allah's will, *Alga's* attack, and heavy work as potential causes of a miscarriage, which engendered unique cultural practices like religious practices (such as fasting, prayers, and offerings), restriction of pregnant women's activities to keep *Khen*, and avoidance of heavy work, respectively. These practices affected the women's lives considerably such that some women practiced even fasting, which could exert negative impact on their pregnancies as pointed out in another study<sup>129</sup>.

The passive attitudes of these women about the unfavorable birth outcomes believed to be caused by the mighty or supernatural beings are also of a concern. Although these women restricted their various activities, many of them thought they could not do much about what Allah or *Alga* decided for them. This fatalistic view needs attention when it comes to an intervention

because, as reported previously<sup>43,48,126,129,136</sup>, participants with the fatalistic view can prioritize traditional practices over biomedical remedies and their motivations to try something new for their fetuses can be diminished. Therefore, it shows a potential gap that needs to be addressed in the future nutrition interventions for pregnant women: helping these women to recognize themselves as an active player in their pregnancies and convincing them of the possible biomedical ways they can do actively for their own and babies' health, which can be compatible with their traditional beliefs.

Cultural norms related to the mobility of women bring in another issue. Freedom of movement has been one of the main dimensions to explain women's autonomy in South Asian regions in the previous studies<sup>38,46,48,129,132,134,145,146</sup>. Thus, the heavily restricted mobility of the women in this study suggests that their autonomy is limited. In addition, the family influences further restrained the autonomy of these women, particularly in decision-making processes. Permissions the women needed to obtain from their husbands and/or mothers-in-law as well as reinforcement of the cultural beliefs and practices by the family members made the women in this study quite dependent on others. This constrained autonomy, along with the fatalistic views described above, could significantly influence women's intentions and motivations for initiating a behavior not familiar to them. Considering that these features are quite common in the neighboring regions as well<sup>46,92,98,125,129</sup>, a program is needed to address both internal and external issues of the participants to allow these women to be actively involved in a newly implemented program.

As it has been universally observed in other places in the world<sup>85,90,91,147</sup>, food avoidance during pregnancy was closely associated with the cultural perceptions and practices in this area. Although most of the food taboos seem to be associated with the hot and cold theory in general

<sup>85,97,129</sup>, specific practices were slightly different from findings from other studies. For example, proscription of pineapple, a prevalent practice in South Asia <sup>85,87,126</sup>, was also widely practiced in this region. In contrast, eating sweets, fish, tamarind or milk was viewed differently not only from others <sup>85,87,93,125,129</sup> but also even among the participants. One possible implication of this practice is that it could worsen the food availability of those who already experienced lack of food. In particular, fish, a good protein source, is a prohibited item for some pregnant women in this area, for unknown reasons. Thus, as long as any perceived harms associated with fish, for example parasites or cooking method, could be addressed in culturally acceptable manners, it would be possible to modify the traditional views without interrupting pre-existing beliefs greatly. Sharing stories of peer mothers, who experienced safe pregnancy in spite of eating fish, would also be a helpful way to encourage the women to adopt a modified practice.

The women in this area also revealed their practices of reducing food intake. Interestingly, in most cases, this practice was not for fear of having a big baby but for many other reasons, including loss of appetite and perception of having a small stomach. Other researchers have also observed the less-than-anticipated effect of the big-baby belief <sup>88,125,129-131</sup> and similar reasons for decreased food consumption <sup>88,125,129-131</sup>. This shows that the practice remains in this area even though the reasons behind it might have been changing. Therefore, continued attention to this practice is required for nutrition program providers. Moreover, these perceptions were not limited to the early pregnancy but rather persisted for the entire pregnancy. This adds importance to understanding this cultural practice for an effective program.

Another noteworthy feature of the results was that a pregnant woman must confront two conflicting ideas: cultural perceptions and economic situations that direct women to decrease their food consumption versus health information to eat nutritious foods in an increased amount.

It is not simple for a pregnant woman to decide whether to increase or decrease her food intake, so it is difficult to predict how the woman would react when a nutrition program for pregnant women is implemented. This issue makes it important to understand the participants' concerns or perspectives regarding services a program is providing.

One of the major limitations of this study was language barriers because the principal investigator did not understand or speak Bengali. Moreover, because interviewees of this study, Bangladeshi women, were shy in speaking their thoughts and opinions, many of them spoke in fragments of information and did not answer to questions in full sentences. These made the translation into English difficult, which made some responses not as useful in describing what the women actually meant as hoped. To reduce potential loss of information, all interviews were recorded and transcribed, then the transcription was checked by field research assistants. The checked transcriptions were translated into English then the translations were also checked by a person who was not involved in either data collection or transcription.

Another limitation was that the in-depth interviews were conducted only among pregnant women and did not include others who could have provided valuable information about pregnancy-related cultural features. Family members, particularly husbands or mothers-in-law, community health workers, traditional birth attendants, and maternal health providers could have elicited pregnancy-related matters from different perspectives, which would have permitted more comprehensive understanding of socio-cultural environment of pregnant women were situated. Nonetheless, it was still possible to gain pregnancy-associated cultural beliefs and perceptions of other people from the interviewee's narratives.

Finally, it would have been better if follow-up interviews were conducted with some key informants. Particularly, regarding the concerns and worries related to pregnancy, cognitive

mapping could have been done with these key informants, which may warrant a further study.

The strength of this study was, however, a total of 24 women were interviewed, which made it possible to reach theoretical saturation in the content analysis. In addition, a well-trained research assistant who studied a graduate level of anthropology and had experiences in field work facilitated the interviews so that pregnant women sufficiently shared their pregnancy-related perspectives in spite of their shyness to responding to questions. As a result, findings of this study added cultural features to what was already known about the region. Particularly, compared with previous studies<sup>111,148</sup>, this study showed that there is significant intra-cultural diversity in cultural beliefs and practices among pregnant women, which implied some traditional cultural features that used to be strongly ingrained in this area might be changing and influencing maternal healthcare environment dynamically. Inasmuch as this study revealed many socio-cultural features in a rural area of Bangladesh that are specifically related to pregnancy, the results can be generalizable to other settings where cultures and social environments are similar to those of Matlab.

In conclusion, behaviors of pregnant women are closely related to culture-specific beliefs and perceptions as well as social context the women are situated. Cultural and social features significantly affect the women's responses when they are asked to adopt behaviors culturally unfamiliar to them or possibly in conflict with the preexisting cultural practices. Although some factors may not appear to have direct influence on the participants' behaviors, it is still important to consider them because they can provide insight into many practical concerns associated with program implementation and more importantly the perspectives of program participants. Inasmuch as a nutrition supplementation program for pregnant women requires behavioral changes of participants in general, it will be meaningful to examine how the culture-related



factors found from this study actually influence pregnant women's participation behaviors toward nutrition supplements, which suggests the need for the next study.

### **Chapter 3. The influence of cultural context on participation in a nutrition supplementation program**

#### **Abstract**

A nutrition supplementation program for pregnant women involves various behaviors changes participants, which requires understanding potential factors that either facilitate or hinder women's participation. An ethnographic study was conducted to explore socio-cultural factors affecting the use of nutritional supplements among pregnant women in rural Bangladesh. In-depth interviews using a semi-structured interview guide were conducted with 24 women who had previous experience with a prenatal nutrition supplementation program. Text analysis of transcripts revealed various facilitators and barriers to acquiring and consuming the supplements. Facilitators include support from family, decreased access to food, advice from medical professionals, positive attitude toward supplementation, recognition of the benefits of supplements, and strong individual intention to consume the supplements. Among the barriers were perceptions of poor appetite, fear of needing a Cesarean delivery caused by a large-sized baby, a gap between anticipated and experienced benefits of supplements, and disapproval by husbands and mothers-in-law. Sharing the supplements with others and replacing home diet with the supplement were also reported. Pregnant women showed bidirectional responses to poor economic status of household and were also afflicted with potential two difference consequences of consuming supplements, a large-sized baby versus a healthy baby. Some barriers had potential to be transformed into facilitators through appropriate actions for modifying women's perceptions where the role of medical professionals and family members need to be emphasized. Thus, to enhance pregnant women's participation in a nutrition program, it is essential to obtain participants' perspectives about supplement use and to address factors affecting their participation, particularly those with the potential to play dual roles.

### 3.1 Introduction

Nutrition supplementation programs for pregnant women often require that participants change their behaviors for a relatively long period. In previous interventions, food supplementation generally starts from mid-pregnancy <sup>69,149-151</sup> or the third trimester <sup>152-154</sup>, and therefore lasted around three months until delivery. The duration of micronutrient supplementations ranges from two months <sup>29,30,106,155,156</sup> to over six months <sup>33,157-159</sup>, while 12 weeks of iron supplementation has been suggested as necessary to reach the maximal hemoglobin response <sup>160</sup>.

The duration of nutrition supplementation is of concern because it has been known that a long duration of any treatment usually reduces compliance <sup>54,63</sup> and also because participants may face barriers to continuing their consumption of the supplements. For example, in many countries, pregnancy is perceived as an ordinary state, not different from non-pregnancy, so that even antenatal care is unnecessary if a pregnant woman does not have any problems <sup>43,48,124,126,136,161</sup>. Thus, taking supplements during pregnancy may not be considered important, and this can decrease the intake of supplements. Moreover, in many resource-limited regions, nutrition supplements, particularly micronutrient pills, are generally viewed as biomedical treatments, which often considered incompatible with their traditional ones <sup>68,70,104</sup> or proscribed during pregnancy <sup>68,70,94,95,98,162</sup>. If pregnant women are asked to visit a designated place daily to consume the supplements in food supplementation programs <sup>69,149-151</sup>, it can be assumed that factors that influence the use of antenatal care also may affect uptake of the supplement. These includes cultural beliefs and practices, confined mobility, workload, economic status of the household, and family influence <sup>41,43-45,47,81,83,124,146,163</sup>,

As mentioned in Chapter 2, pregnant women's behaviors are closely related to culture,

and the cultural contexts may significantly influence the use of nutrition supplements.

Previously, it has been found that iron pills were not taken because they were believed to be the cause of miscarriage <sup>98</sup>, having a big fetus <sup>11,67,68,101</sup> or excessive bleeding during delivery <sup>85,124</sup>, and were considered to harm the fetus <sup>70</sup>. Conversely, when pregnant women experienced benefits from taking pills <sup>70</sup> or the effects of iron supplements were perceived as helpful <sup>67</sup>, the pill consumption was increased. In addition, these beliefs can contribute to the decision-making process of pregnant women on health-related behaviors <sup>48,68,98</sup>.

But little is known about cultural influences on the participation in food supplementation. In a study where the impact of a national food supplementation program on birth weight in Bangladesh was investigated <sup>150</sup>, context-specific behaviors of pregnant women, including sharing of the supplements or substitution home diet for the supplements, were proposed as potential causes of the smaller-than-expected effect and further research on this topic was proposed. Likewise, for successful program implementation, it has been also suggested that more studies are needed to identify cultural factors that potentially inhibit or facilitate intake of nutrition supplements <sup>20,21,24,67,68,70,85,90,95,98-104</sup>.

Therefore, in this chapter, the relationships between cultural factors and participation behaviors were examined in the context of the MINIMat study based on the understanding about the cultural contexts and perspectives of pregnant women gained from the previous analysis. Acquisition and consumption of the supplements were considered two separate participation behaviors and were explored as the main behaviors of interest. Through comprehensive and closer understanding about pregnant women's attitudes and perceptions toward nutrition supplements and the influences of the culture on the actual behaviors of these women, ways to improve the participation of pregnant women were sought. In particular, information on how a

woman makes decisions under various circumstances added valuable insights to guide program participants for a better pregnancy outcome. Finally, cultural factors found to be influential could be considered in the planning of future programs that would be not only effective but also culturally competent <sup>164</sup>.

## **3.2 Methods**

### ***3.2.1 Study population***

The feature of study population was described in detail in Section 2.2.1 of Chapter 2. Matlab has been a research site of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B.) for more than 50 years. Pregnant women in this area have been receiving food and micronutrient supplements through the National Nutrition Program, formerly Bangladesh Integrated Nutrition Programme. From 2001 to 2004, pregnant women, regardless of their nutritional status, participated in MINIMat.

### ***3.2.2 Selection of informants***

The selection of informants was described in detail in Section 2.2.2 of Chapter 2. Thirty multiparous women, who were pregnant or newly delivered, were randomly selected from the Demographic Surveillance System (DSS) of the ICDDR, B. in July 2009. Among these thirty women, only 24 were included, among which 22 had participated in the MINIMat study.

### ***3.2.3 Data collections***

#### **3.2.3.1 Interview guide**

An interview guide comprised of a few grand-tour questions and potential follow-up

probes was developed to guide the interviews. Guide questions covered various issues the women could face during pregnancy as mentioned in the previous chapter. In addition, specific questions regarding experience with nutrition supplements were asked to examine the relationship between cultural factors and participation behaviors: overall description about the nutrition supplementation and processes how they received the supplements, the women's attitudes, perceptions, and knowledge about the supplements, any difficulties they faced in taking the supplements, family members or community's responses to the nutrition supplementations, and any effects, whether benefits or side-effects, they experienced after taking the supplements. The more details were described in Section 2.2.3.1 of Chapter 2.

#### 3.2.3.2 Training of the interviewer

Before conducting interviews, a training session was held in Dhaka for the research assistant to be familiar with main topics. Interview guides were also checked by field manager to make the interview guide culturally competent. After first two interviews, intensive discussion was made to modify the flow of questions and probes to help interviewees to elicit their experiences. More details regarding this training session were described in Section 2.2.3.2 of Chapter 2.

#### 3.2.3.3 Actual interviews (Same as 2.2.3.3)

In-depth interviews were conducted in a private place in each woman's house after locating interviewees. Each interview took approximately one hour. Although many women were shy in sharing their experiences, women's answers were probed to elicit more information. All interviews were recorded after obtaining approval from the interviewees. More details of interviews were described in Section 2.2.3.3. of Chapter 2.

### **3.2.4 Data analysis**

#### **3.2.4.1 Transcriptions and translations (Same as 2.2.3.1)**

Interviews were transcribed verbatim in Bengali then translated into English. Each step was checked by third personnel to assure the quality. Detail description was provided in Section 2.2.3.1 of Chapter 2.

#### **3.2.4.2 Text analysis**

Text analysis was carried out with ATLAS.ti v6.2. Codes include pregnancy-related cultural features as described in Chapter 2. In particular, experiences with nutritional supplements were coded in detail. Women's description about the program, including enrollment, duration, procurement, and distribution, as well as their attitudes, perceptions, and actual utilization of the supplements were searched comprehensively. All codes were grouped into bigger categories and then their relevance to acquisition and consumption of the supplements was identified through content analysis<sup>141,143,144</sup>. In particular, factors that prohibited or supported the acquisition and/or the consumption of the supplements were examined extensively. The identified factors were grouped into domains based on the similarities in their roles in affecting supplement use. De-briefing meetings were held occasionally to discuss about the codes and the domains. To verify the assignment of codes and the potential barriers and facilitators identified, a quarter of the randomly selected interviews were coded by the second coder and compared.

### 3.3 Results

Even though several years had passed since the nutrition supplements were served to them, women were able to describe their experiences using the supplements when they were pregnant and recalled various factors that influenced their participation in the nutrition program. The major factors elicited by the women were cultural beliefs, opinions of family influence and of medical professionals, perceptions about the supplements, and the will of the women themselves.

#### 3.3.1 *Cultural beliefs and perceptions*

Pregnant women in the study area held various beliefs regarding the effects of their behaviors on pregnancy outcomes. Beliefs related to maternal and fetal death appeared to engender unique practices that, in turn, may have influenced acquisition and consumption of the nutrition supplements.

##### 3.3.1.1 *Alga*

The belief in *Alga*, an evil spirit believed to cause miscarriage by attacking pregnant women, was so prevalent that most pregnant women followed a rule that was specific to time and place, “*Khen*,” to avoid unnecessary contact with *Alga*. The mobility of pregnant women was intensively restricted at noon or in the evening and, at other times, it was not recommended for these women to pass by “bad” areas, such as graveyards, swamps, bamboo bushes, and ponds where *Alga* would easily attack its targets. Although the supplement program required the pregnant women to go to a community nutrition center (CNC) every morning, this did not appear to make the women break the cultural rule regarding *Alga*, as the food supplements were provided around 9 or 10 am. But those women who needed to travel long distances might have



had problems in avoiding bad areas, which could negatively influence their acquiring food supplements. For example, one woman said, “I have problem in going [to the CNC]. I didn’t go. [For] Those who had no difficulties in going [to the CNC] and bring [the supplements], [the supplements were] home delivered. [My problem] Means a little far that’s it. That’s why [I] couldn’t go as a daughter-in-law. Then [it was] home delivered. That’s it” (Interviewee 10).

In most cases the CNC was located nearby, however, the mothers did not explicitly state that they experienced any *Alga*-associated issues. Also, some women mentioned that when they were not able to go to the center, the supplements were delivered to their home (see Appendix 3.1.1).

#### 3.3.1.2 Allah

Allah, believed to have almighty power and govern all matters regarding human lives, was associated with many issues concerning pregnancy, particularly the life and death of the mother and the baby. The pregnant women did not mention any direct relationship between Allah and nutrition supplement use. But their faith in Allah was so strong that some women tended to be fatalistic, such that they accepted whatever consequences that might be given to them. This seems to have led the women to be passive about making an effort to have better birth outcomes, including taking nutrition supplements. One woman said, “I eat anything when I am pregnant. I eat the same things when I am not pregnant. Whatever Allah gives, we eat that” (Interviewee 26).

These women actively took part in religious rituals, such as praying or giving offerings for healthy babies or a safe delivery. Moreover, a few pregnant women said that they even fasted as a religious practice, which could influence the health of the fetus negatively. One woman said, “[I] Couldn’t even eat properly. Then fasted. That’s it. Now [I] also keep fasting, and [I] was also [observing]...Fasting for one month and do not perform fasting during the rest of the period. [I

did] Not [eat the supplements] during Ramadan. During Ramadan, [I] didn't eat *Pushthi*" (Interviewee 19). She also stated that fasting was the reason that she had to skip the nutrition supplements.

#### 3.3.1.3 Beliefs concerning a big baby

The fear of having a big baby was another cultural belief that affected pregnant women's nutrition supplement use. In general, this belief was not as strong as *Alga* or Allah-associated beliefs because family members, particularly their mothers-in-law, rather than the pregnant mothers themselves, were more likely to be concerned about having a big baby. People of an older generation asked the pregnant mother to be cautious about the amount of food she consumed because they believed that the more a pregnant woman ate, the bigger a fetus would be, which might potentially bring problems in delivery (see Appendix 3.1.3). In fact, one woman said,

The elders say that the nutrition packet makes the baby big inside the tummy if we eat it. So then it's difficult to have a normal delivery for that baby and it requires a scissor-surgery... The elders say that the consumed nutrition packets make the baby big inside the womb (Interviewee 16).

Thus, it seems that this cultural belief might have led mothers to reduce their food consumption, including nutrition supplements, either voluntarily or by external exhortation. The effect, however, may have been weak, as many women explicitly said that they did not believe in this cultural norm (see Appendix 3.1.3).

In fact, some of the women wanted to have a big baby, as they thought that a big baby would be a healthy and strong baby. These women were willing to increase their food intake as well as take the supplement. As one woman indicated, she expected a positive effect of the food supplements on the health of the baby: "At parental *abode* (home), they used to tell me to eat

that. After eating *Pushthi*, the baby would remain healthy. Baby would be big. Neighbors who gave *Pushthi* said so” (Interviewee 19). This indicates a possible role of a women’s desire to have a big baby on increased supplement use (see Appendix 3.1.3).

Therefore, the views regarding having a big baby might have either a positive or a negative effect on the acquisition and consumption of nutrition supplements. It seems that the way a pregnant woman perceived having a big baby would determine whether she would increase or decrease food and supplement intake.

#### 3.3.1.4 Perception of appetite

In this study, the pregnant women frequently reported poor appetite throughout the entire pregnancy as a factor affecting their dietary intake. The women in the study area, like women everywhere, experienced a loss of appetite and a subsequent decrease in food consumption due to morning sickness (vomiting) during early pregnancy (see Appendix 3.1.4). One unique feature in Matlab, however, was that reduced appetite was not limited to early pregnancy: women perceived that there was a decreased desire to eat throughout their pregnancy. For example, one woman reported a decrease in appetite even during the last stage of her pregnancy (see Appendix 3.1.4); “[I] Did not like to eat. [I] Did not feel good to eat. There is no other reasons. [I] Did not feel good for eating. It was like this for 3-4 months. I did not feel good at all for eating. [During the] Last three months” (Interviewee 12). This common perception of continuously low appetite during pregnancy may have posed a barrier to the use of nutrition supplements so that pregnant women may not have actively participated in acquiring and consuming the nutrition supplements.

Moreover, some women didn’t feel hungry after starting the food supplements (*Pushthi*): they felt full for a long period after taking them. Inasmuch as these women depended heavily on

feelings or “urges” to decide whether or not to eat, the fullness caused from the food supplements might have contributed to a further decrease in appetite, which in turn could have negatively affected the use of supplements. This was described by one woman: “If [I] eat *Pushthi*, then the urge for food doesn’t remain... Then eating will be certainly less... Less urge for food” (Interviewee 19). (See Appendix 3.1.4)

Nevertheless, some of the mothers revealed motivations to overcome their reduced appetites and to increase supplement use. Among the motivations was the desire for having a healthy baby. As most of the women thought a pregnant woman needed to consume more food for the well-being of the fetus, they tried to eat more in spite of their losses of appetite, which subsequently increased their supplement consumption (see Appendix 3.1.4).

In addition, one woman said that she expected that she would feel hungry as a result of taking iron supplements. This is possible because, by treating iron deficiency, pregnant women’s appetite can be improved<sup>70</sup>. Thus, by making the women who were in need of iron supplementation understand the benefits of taking micronutrient pills, it would be possible to increase their appetite, and subsequently to facilitate the consumption of the supplements: “They tell me to think that if this (means iron tablets) is taken, then physique will not be weak and [I] will feel hungry” (Interviewee 15).

Therefore, the perception of reduced appetite during pregnancy seemed to be a hindrance for women in acquiring or consuming food supplements. Nevertheless, it still seems possible to induce a change in behavior of consuming of nutrition supplements, by helping women to understand the potential benefits of taking supplements.

#### 3.3.1.5 Other beliefs and perceptions

Physical weakness and anemia appeared to be facilitating factors to consider for nutrition supplement use among the women in the study. As pregnant women perceived these factors were associated with potential harm to themselves and the fetus, including the possibility of death, they adopted several strategies to be strong and healthy. Many women expected that they would have more energy and strength if they increased their food intake. One woman said, “[For those] Who eats a lot, her baby will be strong and healthy. Mother will be well and her baby will be good in health. If [she] eats good food” (Interviewee 26).

Nutrition supplements were seen as a way to improve the women’s health status. In particular, taking iron supplements was considered a remedy for anemia and physical weakness. As one woman said,

They said that it would give strength and [it would be] better for the fetus and for us also. So I ate them. This is why doctors gave that tablet... I wanted to be healthy and strong, which supported me at the time of delivery. I would not be anemic. My delivery would be safe and my fetus would be intelligent (Interviewee 25).

Some thought they would need to seek medical assistance and take medicines to treat feelings of weakness. Although it was not clear whether or not these women actually sought treatment, it was apparent that at least they had a positive attitude about taking supplements for physical weakness and anemia (see Appendix 3.1.5).

Pregnant women were strongly encouraged to consume nutritious foods, such as milk, fish, eggs, fruit and vegetables, for the health of the fetus by family members and others. Even those women who reduced the amount of food they consumed during their pregnancies said that they tried to eat as nutritiously as possible. In this regard, the food supplement, *Pushthi*, in particular, was thought to provide energy, strength or nutrition to the fetus as well as the mother.

Thus some of the women intentionally consumed the supplements (see Appendix 3.1.5).

There were some cultural taboos concerning food. The women in the study described the proscriptions of certain types of foods, including mainly fish, chili, and pineapple, which did not seem to have any relationship to the consumption of nutrition supplements (see Appendix 3.1.5).

In summary, feeling weak and experiencing anemia could lead to the acquisition and consumption of nutrition supplements because the women wanted to be stronger and healthier to avoid undesirable birth outcomes. Among other cultural norms, encouraging the women to consume nutritious foods seemed to have potential to exert positive effect on the nutrition supplement use.

### ***3.3.2 The influence of family***

#### **3.3.2.1 The role of husbands and mothers-in-law**

As discussed in Chapter 2, the women in this study appeared to depend considerably on the opinions of family members, which may have affected the women's behaviors regarding the use of nutrition supplements. It was a prevalent belief that a baby would be strong and healthy if the mother ate good foods, so people advised pregnant women to consume nutritious foods as much as possible. In some cases, husbands brought foods thought to be nutritious for their pregnant wives (see Appendix 3.2.1). Thus, by and large, if family members acknowledged the potential nutritional benefits of the supplements on a fetus, they had positive attitude toward the nutrition supplements for pregnant women. In addition, according to the women's descriptions, even family members who did not know the specific effects of supplements believed pregnant women should take the supplements simply because they were recommended by medical professionals (see Appendix 3.1). As a result, many families encouraged pregnant mothers to

participate in the supplementation program, and reminded them to consume the supplements when they forgot to take them. One woman said, “They said to eat. They said that the *Pushthi* was for goodness... My family members told me why [I] didn’t. eat it, that I need to take it, and that I should not throw it away” (Interviewee 9). More actively, some family members, particularly mothers-in-law, helped the pregnant women to finish housework so that they could go to the nutrition centers to consume the daily food packages (see Appendix 3.2.1).

The mobility of pregnant women was another consideration. In addition to the cultural norms restricting women’s movement, many women needed permission to leave their houses. Particularly, the permission from husbands or mothers-in-law appeared to be so essential that it may have critically affected these women’s decisions on whether or not to participate in a nutrition supplementation program (see Appendix 3.2.1).

In some cases, a pregnant women’s participation in the nutrition program was decided by her husband (see Appendix 3.2.1). Some women also reported that there were occasions when family members did not allow them to go to the center to obtain and consume the food packages. This type of restriction happened even when a woman’s family had a positive view of the supplements. For example, one woman said that her husband favored her taking of supplements, but sometimes he told her not to go to the center; so she followed her husband’s suggestion and skipped taking the supplements:

[My husband] Did not opine anything bad and said [that it would be] good, [so] took [it]...Later he said then [I] went. When [he] forbade, then [I] did not go. It could be on any day. If work was there or [if I] had more commitment like that everyone got together in the family...for that [he] thought and said to me to hang around, then I didn’t go that day and went the next day, like this (Interviewee 11).

In the case of mothers-in-law, there were generational differences in perceptions of supplement use among pregnant women. As indicated previously, the women of older

generations seemed to think that taking the nutrition supplements might lead to having a big baby. In addition, some of the mothers-in-law did not understand why women would need any medical assistance during pregnancy. Because they perceived receiving nutrition supplements as a medical service, they were critical of their daughter-in-law's taking nutrition supplements. For instance, one woman said, "The people of old age said, 'why is it necessary to take the tablet? we did not take, what is wrong with her (daughter-in-law)?'" (Interviewee 26). (See Appendix 3.2.1)

Therefore, it was apparent that husbands and/or mothers-in-law acted as "gate keepers," deciding whether or not women participated in the nutrition program. As husbands and mothers-in-law are often the main care-takers for pregnant women, it seems to be essential to make these relatives recognize the expected benefits of the supplements and the nutrition program. Moreover, their roles as gate keepers need to be considered importantly in relation to pregnant women's acquisition and consumption of nutrition supplements.

#### 3.3.2.2 Household economic status

The economic status of a household emerged as another factor to be considered in relation to the use of nutritional supplements among pregnant women. The poor household status was a concern of the majority of the women because of the costs related to pregnancy and delivery. Inadequate resources for purchasing food of good quality and the cost of delivering the baby were the main issues women worried about (see Appendix 3.2.2). Specifically, the cost for a cesarean delivery appeared to be so burdensome to many households that most women hoped to avoid it if at all possible (see Appendix 3.2.2). But, they recognized that one of the factors leading to an expensive delivery is having a big baby. Since they thought that the size of a baby would be increased by consuming nutrition supplements, poor pregnant women may have hesitated to consume the full amount of nutrition supplements assigned to them to avoid



expensive deliveries (see Appendix 3.2.2). Therefore, as these women also wanted to have a strong and healthy baby, which meant to have a big baby, the conflict between the women's hopes for a healthy baby and their worries about delivery cost may have complicated their decision about participating in the nutrition supplementation program (see Appendix 3.2.2).

Household economic constraints also limited the quantity and the quality of foods for pregnant women. Although pregnant mothers knew that nutritious foods were required for their well-being and that of their fetus, many of the women only consumed foods based on affordability. As one woman said,

We have need in my family. He (husband) brought his sister. We can't manage normal expenditure of our family. From where could we manage the extra expenditure? *Apa*, really, we are in need. There is no rice and no *dal*. There is only need... I would eat then when there would be food in house. Sometimes I lied to them that I had taken food..... There is need in my family. What should we eat? (Interviewee 5)

This shows that some of the women also experienced a shortage of food not only for themselves but also for other family members. Therefore, the perceived nutritional value of the supplements may have led these people to participate in the nutrition program to compensate for the lack of food and adequate nutrition (see Appendix 3.2.2). In fact, one woman said that most of the women in this area would need this kind of program to make sure they would have enough nutrients for desirable pregnancy outcomes:

It (supplements) is good for the mothers. There are many poor ladies who cannot even get a proper meal all day long. If they get nutrition they surely would get one meal at least. We don't have any problem about food. But there are women around us who can't even manage to eat proper meals... So if nutrition is given [to them], then they will be able to eat at least one meal properly. So it's good for those mothers (Interviewee 16). (See Appendix 3.2.2)

In summary, among those women who experienced economic constraints, the fear of having a big baby and the subsequent worries about the cost of delivery could have negatively

affected the women's participation in the nutrition supplementation program. In contrast, poor economic status may have facilitated the some women's decision to take nutrition supplements because they could not otherwise afford to consume nutritious foods. The way a woman would resolve the conflict between the two opposite consequences of having nutrition supplements is an important issue to consider for understanding acquisition and consumption behaviors of pregnant women in a nutrition supplementation program.

#### 3.3.2.3 Sharing the food supplements with family members and the replacement of home diet

Quite a few of the pregnant women reported that they shared the food supplements with other people even though they had been asked not to. According to the program guidelines, these women were expected to consume the full package at the CNC daily, except for women in their late pregnancy, who had the supplements delivered to their homes. Thus, sharing should have been possible only when these women were allowed to bring the supplements home. In fact, many women reported that they were able to take the package home easily. Particularly, when they could not go to the center, the package was delivered to them by the community nutrition worker or by other family members they sent to the center to pick up the supplements for them. When the women did not finish the whole packet, they were allowed to bring the leftovers home. The women reported that the main reasons they could not finish their assigned package was because of the substantial amount and the poor acceptability of the supplements (see Appendix 3.2.3).

Once the supplements were brought home, the women shared them with family members, mostly with their children. One woman said that she even tried to save some for her children: "If children are in front of a mother, how she cannot help giving them also? When they were around

me or sometimes, I kept [some] for them also” (Interviewee 5). But not all family members liked to eat the supplements. So the women shared the supplements with anyone who wanted them. They also gave them to livestock or even threw them away (see Appendix 3.2.3). Although there were a few women who said that they never shared the food supplements, sharing behaviors seemed to have been common during the program period, which may have considerably decreased the amount of supplements consumed by pregnant women.

In addition, once the supplements were available at home, pregnant mothers replaced their home diet with them. For example, one woman said, “I ate less [for breakfast] as I would eat the nutrition (*Pushthi*). Home-made food? I ate that less” (Interviewee 5). (See Appendix 3.2.3)

Many of the women reported that they ate the supplements instead of meals. As most of the pregnant mothers could not finish the whole package at one time, they consumed the leftover portion whenever they felt hungry. Some women reported that they even divided the package into smaller portions and ate them throughout the day (see Appendix 3.2.3).

Moreover, although these women were told to have a full breakfast before coming to the CNC for the food package, many of them revealed that they skipped breakfast or they only ate a light breakfast (see Appendix 3.2.3). Some women who said they did not feel like eating other food after taking the supplements, which also contributed to reducing the home diet consumption (see Appendix 3.2.3).

In summary, sharing the food supplements with others seemed to happen frequently when the supplements were available at a pregnant woman’s home. This indicates that there was a considerable gap between acquisition and actual consumption of the supplements among program participants. Moreover, although many of the pregnant women consumed the food

packages assigned to them, they might have replaced their home diet with the supplements significantly. Thus, due to these sharing and replacement behaviors, the participants may not have actually received the full benefit of the supplements.

### ***3.3.3 The influence of medical professionals***

Medical professionals, including doctors, nurses, and community nutrition workers (*Pushthi apa*), appeared to have a significant influence on pregnant women's perceptions and behaviors. Women in the study perceived that the most prominent role of medical professionals was giving advice regarding consuming nutritious food, reducing workloads, getting rest, seeking hospitals for illnesses, and taking proper medicines during pregnancy (See Appendix 3.3). As one woman said,

I do believe in everything what the doctors say. I have that belief. Sometimes they said. They gave us a card, where it was written that if any pregnant mother ate less food, it would be a reason for the baby to die, pneumonia, it might bleed in navel, and the mother might die. Do the doctors want to do harm to us?... Is there anything to distrust the doctors? Is there any benefit by throwing out this? I will eat then... Those who understand that the doctor is right, they will not go to *Kobiraj* (traditional healer). They will go to the Matlab hospital (Interviewee 26)

Most of the women had a firm trust in medical professionals, particularly doctors, and showed a strong intention to follow what doctors said (see Appendix 3.3). Even when the women experienced conflicts between advice from family members and that from medical professionals, particularly regarding issues like heavy work, and seeking hospital and delivery places, (which generally appeared to be determined by family members), many of the women chose to follow the doctors' advice over that of family members. For instance, one woman said, "Like, 'why will you go to hospital? We will make your baby delivered in the house. Hospital is not good,' some of my family members said these... I think doctor's advice is more important...I do not listen to

elders, and listen to doctors” (Interviewee 7). (See Appendix 3.3)

These women revealed a few reasons that they decided to follow doctor’s advice (see Appendix 3.3):

- 1) they believed that doctors always provided advice good for mothers and fetuses;
- 2) they thought doctors were experienced and knew everything better than their family members; and
- 3) they felt that a doctor’s advice was easier to follow than that of others.

Additionally, it appeared that education by medical professionals played an important role in making these women recognize the potential benefits of the nutrition supplements (see Appendix 3.3). In general, pregnant women were educated during antenatal visits or when they received the nutrition supplements at CNC. Many reported that they took the supplements because medical professionals gave or recommended the supplements, and these women also expected that the supplements would be beneficial because doctors and *Pushthi apas* said so. Furthermore, there were many families that showed such trust in doctors that they asked the pregnant women in their family to follow whatever guidelines suggested by medical doctors (see Appendix 3.3).

This suggests that medical professionals can contribute to improving pregnant women’s participation in a nutrition supplementation program significantly by providing adequate information and encouraging women to acquire and consume the supplements consistently throughout their pregnancy. There were some women who felt that they did not obtain enough information or guidance from medical professionals, particularly regarding the purpose of nutrition supplements. This needs to be considered to promote better acquisition and consumption of nutrition supplements among pregnant women.

### ***3.3.4 Expected benefits and perceived benefits***

The majority of pregnant women who participated in the nutrition program expressed expectations about the potential effects of the supplements. Whether it was the food packages or the micronutrient pills, the women commonly thought that the supplements would have benefits both them and their fetuses. Being healthy was a general expectation these women described as a potential effect of the supplements: “I used to go to the nutrition centre. There the sisters used to say that it (supplements) would be good if I eat the nutrition (*Pushthi*). It would keep both the mother and the baby healthy. I was influenced by her sayings. I was inspired” (Interviewee 16). (See Appendix 3.4)

The specific benefits that women anticipated included providing vitamins, energy, or strength to their body: “Strength! The *Pushthi* is nutrition. *Pushthi* is one kind of energy for body. So [I] ate that for this reason” (Interviewee 19); “It (iron tablets) will produce blood. Calcium and energy...[I] Will have energy, and blood will be formed. Fetus will remain healthy, and it will be healthy if the mother is healthy. Baby will be also healthy” (Interviewee 6).

They also expected that their babies would not be malnourished, or a baby would be born big enough to be healthy by consuming either type of supplement: “Baby becomes healthy and heavy. Baby doesn’t suffer from lack of nutrition” (Interviewee 5). Some women believed that by taking the supplements, disease could be cured or prevented, or that their babies would be more intelligent: “It (iron tablets) has vitamins, and it will benefit the baby. They are saying that it will be good for baby’s brain” (Interviewee 11). (See Appendix 3.4)

People expected to obtain extra nutrition from the food supplements and to feel less hunger. One woman mentioned that her fetus would move properly in the womb by receiving nutrition from the food supplements (see Appendix 3.4). Micronutrient pills were perceived as

either vitamin or iron tablets even though most of these women did not know which type of supplement pills they received. The main anticipated effects of micronutrient pills were blood-associated results: the blood would be cleaned or increased by the supplement. Several women specifically said that iron would be provided to the body and anemia would be improved. A few also expected that their physical tiredness would disappear, their deliveries would go smoothly or their appetites would be improved (see Appendix 3.4).

All of these expectations seemed to play important roles in the decisions to participate in the nutrition program. Several women revealed that they tried to consume the supplements as suggested even though they experienced side-effects or they did not like to take them, but wanted the potential benefits of the supplements. For example, one woman said, “I didn’t like to eat it (food packages). I ate because I had to. To keep the baby healthy. I ate against my will. I forced myself to eat, had to fight with my mind to eat it just to keep my baby healthy (Laughter)” (Interviewee 16). (See Appendix 3.4)

One woman’s family members favored only micronutrient supplements due to the possibility of having a big baby: “They think that if I take the vitamins, the baby would become bigger inside the womb and it will cause problem for the delivery...This (iron tablets) is for reducing blood deficiency, so [they] don’t say anything” (Interviewee 16).

Apart from these expectations, the pregnant women also described the benefits that they actually experienced with the nutrition supplements. Those mothers who observed any effects commonly stated that their babies were born healthy, strong or wholesome. A few of them also said that their babies stayed healthy after the birth and did not become sick or weak.

But the mothers were not certain that the benefits were as significant as they expected. For example, some thought that their babies were healthy not only because of the supplements

they consumed but also thanks to the grace of Allah: “My baby didn’t have any problems. By the grace of Allah, [she] was born wholesome as regards to nutrition, were not born malnourished. The baby may be less strong. Despite many diseases around, she is good in this aspect...[she] wasn’t born malnourished, 3 or 3.5 kg” (Interviewee 11). (See Appendix 3.4)

Few women observed positive effects of the supplements in relation to their own health status. Those who experienced benefits mostly said that they just “felt better” after taking the supplements and did not describe the effects specifically: “I thought it (iron tablets) is good so I ate it. Good means my baby will remain good and I will be also good...It had an impact. Child also got *pushthi* (nutrition)” (Interviewee 1). (See Appendix 3.4)

Moreover, several women did not observe any benefits from the supplements as their babies were small at birth, or the babies became weak after birth (see Appendix 3.4). Therefore, it seems there was a gap between the expected and perceived benefits of the supplements, which may negatively influence their future participation in the nutrition program. But the majority of women expressed their intention to participate in a future nutrition program if it were provided again.

In summary, the pregnant women had various expectations about the effects of the supplements, which may have contributed to enhance these women’s motivations to participate in the nutrition program. But the benefits they actually experienced appeared to have some gaps with their expectations. Therefore addressing the potential reasons of this gap could help the women to perceive the value of the supplement and thus contribute to improving the future participation of pregnant women by raising public awareness as well as motivating individuals.



### ***3.3.5 The individual will of pregnant women***

As described in the previous section, the decisions of pregnant women in this area were constrained by various cultural norms and the influence of family members. Women revealed their own passive attitudes toward these restraints in different ways. Some said that they blindly followed the cultural norms without a clear understanding of the purpose of them: “This [restriction of not going out in the evening] I also do not understand. I am just abiding by what they are saying” (Interviewee 7). (See Appendix 3.5)

Others said that although they did not believe the cultural practices and the reasons behind them, they had to abide by them because of pressure from their family to conform to the tradition (see Appendix 3.5). Particularly, many of the women had to follow the words of their husbands regardless of the women’s own wishes: “[I] Will listen to husband’s one (advice). Husband’s one have to be listened to. At the time of delivery of my last baby, everyone said to deliver at home. My husband said that it would be at hospital, so [the baby] was born at hospital” (Interviewee 14). (See Appendix 3.5)

Many women did not even control decisions regarding food purchasing, not only because of the poor economic status of their households, but also because of women’s limited accessibility to markets in the study region. As their husbands were primarily responsible for bringing food home, the women only consumed whatever food was made available to them: “I have told you that if those (fruits) were brought to home then I ate. Otherwise not...I didn’t take any nutritious [food]. Maybe I ate 1 or 2 mangoes during the mango season or if he [husband] brought apple or if anything was shared, then I could eat” (Interviewee 5). (See Appendix 3.5)

The passive attitudes of the pregnant women were also shown in relation to nutrition supplement use. Several women revealed that they consumed the supplements just because the

program provided the food package and the micronutrient pills. For instance, one woman said, “The service provider suggested so we ate” (Interviewee 27).

Regarding the benefits expected from the supplements consumption, most of the women mentioned very general effects only, and seemed to have limited understanding about the effects of the supplements: “As they said so, it (iron tablets) must be good. I do not know for what reason they gave it [to me], I did anything as they said” (Interviewee 26). Generally, as the expected benefit has been considered one of the important factors to promote intention to take action <sup>165-167</sup>, which can be interpreted as participating in a nutrition supplementation program in this study, these women’s incomprehension and passive attitude might have negatively affected program participation.

Not all of the women in the study, however, showed a passive attitude on all issues. Many women revealed their strong wills in obtaining certain things according to their wishes (see Appendix 3.5). For example, one woman who wore an amulet at a family member’s request and gave up seeking a hospital at her husband’s insistence said that she would ignore cultural taboos related to food and would eat everything:

I didn’t believe in this amulet previously. Now I have to wear otherwise they scold me a lot. I don’t believe in this anyway. If I don’t use it, they would scold me... When this baby of mine was born I wanted to go to Dhaka but my husband said that I shouldn’t... They said if I ate fish, those rashes would become worse and wouldn’t go away easily. But I ate fish and my baby was fine by the way. I don’t follow this anymore but I used to. (Laughter). I don’t follow it now because I don’t follow any restrictions about food anymore. I eat everything (Interviewee 16).

Another woman expressed her strong intention to keep taking her medicine during pregnancy in spite of her parents-in-law’s objection:

They (parents-in-law) prevented me [from taking medicines], but I took medicines after three months [of pregnancy]. I had to save my life also. It did not mean anything about their opinion. I was less experienced during my first

delivery. So, I did everything what they suggested. And during the second time, I took medicines. I ate medicines what the doctor's advised (Interviewee 27).

A few pregnant mothers did not follow even the *Alga*-related proscriptions, the most prominent belief among pregnant women, and one specifically associated with miscarriage. With regard to the supplement use, quite a few women mentioned that they consumed or stopped consuming the supplements based on their own decisions (see Appendix 3.5).

Additionally, when they were asked about a hypothetical situation where a pregnant woman faced conflicting advice from different groups of people, for example, family members versus doctors, the majority of the women thought that the pregnant mother should decide what would be the good for her and her baby and then follow her decision. One woman said, "One that comes from own understanding. [I] Should follow that one. From own experience which [I] feel good about. That one to be followed" (Interviewee 6). Likewise, several women also mentioned that they would choose what they could understand, which emphasizes the importance of efforts to improve pregnant mothers' perceptions of the nutrition supplements (see Appendix 3.5).

Therefore, in spite of the various constraints the pregnant women might face, these women demonstrated autonomy in certain behaviors as long as they had a clear understanding and a determined will to do so. Furthermore, considering that acknowledging potential benefits of the supplements enabled these women to consume the supplements consistently and even to ignore unpleasant side-effects, promoting the autonomous decision-making of pregnant women based on adequate education and empowerment could be a good target strategy for the continuous participation of pregnant women in a nutrition supplementation program.

### ***3.3.6 Other facilitators and barriers for nutrition supplement use***

Pregnant women revealed other factors that either facilitated or hindered their acquisition

or consumption of the supplements.

#### 3.3.6.1 Morning sickness (or vomiting)

Morning sickness or vomiting appeared to be one of the major barriers against the supplement use as the majority of pregnant mothers experienced vomiting during early pregnancy, for several days to several months in duration. It was revealed that this symptom affected consumption of both types of supplements for many women. Most women said they consumed less food due to vomiting, and some women who could not even drink water for several days:

During the first time when baby came in the womb, at that time [I] could not eat anything. [I] Could not even drink water... For my both children, [I] could not rise from the bed. On water. On saline. [People] gave [me] eight saline [injections]. Kept me on saline...[I] Used to vomit and could not rise from the bed (Interviewee 14).

Some women explicitly said that they could not take micronutrient pills because of the smell of the pills, which caused or exacerbated vomiting (see Appendix 3.6.1). Therefore, the negative influence of morning sickness needs to be considered, primarily in relation to the supplement use in early pregnancy. Moreover, it is important to encourage pregnant women continuously throughout the program so that they will not terminate their supplement consumption due to vomiting in early days of pregnancy; rather, they should continue to take them after the period of vomiting is over.

#### 3.3.6.2 Acceptability of the supplements

Pregnant mothers described various issues around the acceptability of the supplements they consumed. The bad smell of the supplement itself accounted for why some pregnant women did not take the micronutrient pills: “They gave me *Pushthi* and iron tablet at the same time. But

I did not like it (iron tablets)... I felt a bad smell. That's why I did not take more" (Interviewee 2). A few women complained about the bad smell of the food packages as well, especially the smell of soybean oil, which made them reduce their consumption of the supplements:

People treated it (food packages) as a bad smell and told that they mixed soybean oil with it... Something smelled. [I] Took [the food supplement] sometimes. [I] Took it irregularly. But [I] did not mix with the soybean oil. I did not even take the blended pulses. [I] only took the blended rice and something sweet and mixed them then eat it... I took it but did not eat. The raw oil smelled bad. Would it possible to eat the soybean oil as raw? (Interviewee 20)

Regarding the acceptability of the food supplements, only a few of the women complained, mainly because of the smell of soybean oils, while the majority of the women favored the package because they liked its taste, color, and even smell (see Appendix 3.6.2). Also when the women were not provided with the food supplements, some women made and consumed their own food supplements, a mixture of ingredients that resembled the food package (see Appendix 3.6.2). In addition, women who preferred the food supplements to the micronutrient pills mentioned factors like the powder form of the supplement, the stomach-filling effect of the package, and the various ingredients in it as reasons why they favored the package (see Appendix 3.6.2). Nevertheless, quite a few women also revealed that the food packet was cumbersome compared to the pills because they had to travel to the nutrition center to obtain it, then they needed to mix the ingredients (see Appendix 3.6.2). On the other hand, women who favored the pills over the food packages named convenience as the reason they preferred the pills. The color and the taste of the pills were also mentioned as positive features of the pills (see Appendix 3.6.2).

In summary, poor acceptability of the supplements appeared as a negative factor in supplement consumption. The main complaint was the bad smell of the supplements, particularly the micronutrient pills. The food supplement packet appeared to be fairly acceptable to most

women although it was cumbersome to eat. Preference for each type of supplement was also affected by personal taste.

#### 3.3.6.3 Other barriers

Pregnant women described more barriers for consuming supplements. Although in most cases the nutrition centers were located nearby, there were some women who lived far from the centers and experienced difficulties in getting to the centers (see Appendix 3.6.3). Morbidity was another reason women skipped or reduced consumption of the supplements, which appeared to be more so with the food supplements (See Appendix 3.6.3). In addition, as to micronutrient pills, quite a few of the mothers reported forgetfulness as a barrier, and family support, for example, reminding them of taking the supplements, appeared to be an effective strategy to avoid skipping doses. Side-effects including constipation and discomforts, conflicts with responsibilities at home, and being out of town hindered the supplement consumption as well.

Finally, there were women who could not participate in the program from the first because of administrative issues, such as being left out of the registry, or being excluded from the program even though they were eligible for the MINIMat trial. Although the mothers did not discuss these factors extensively, the factors related to program delivery need to be considered equally important with factors discussed previously.

### **3.4 Discussion**

The results showed that many factors influenced whether or not pregnant women acquired and/or consumed the nutrition supplements. Mothers were able to share their experiences comprehensive enough to illuminate how each socio-cultural factor either promoted or hindered their use of nutrition supplements. Some were specifically associated with only one

type of supplement, for example long distance to CNC were mainly associated with the consumption of food supplement package. But most of them were generally applicable to both types of supplements.

Among these, the influences of cultural beliefs and perceptions are noticeable as they have not been examined extensively before <sup>20,68,162</sup>. Many of the cultural features known to be prevalent in the study area <sup>8,92,129,136</sup>, such as faith in Allah, fears of the evil spirit called *Alga*, and the fear of complications from delivering a big baby, were well perceived by the pregnant women. Their influences on the uptake of supplements in this region, however, were less than previously thought <sup>43,92,101,125</sup>. For example, as to the fear of having a big baby, even though it could have caused “eating-down” by pregnant women as indicated in previous studies <sup>8,86,92,129,136</sup>, quite a few of the mothers considered it held only by older generations and did not follow the practice, which made its impact on the mothers’ supplement use negligible. A similar phenomenon was reported in a recent study in a neighboring country, Pakistan, and the eating down from the fear of having a big baby was not practiced any more <sup>88</sup>. Likewise, as discussed elsewhere <sup>168</sup>, some of the women ignored the potentially negative food proscriptions and interpreted this traditional belief in their own ways; they considered a big baby to be a healthy baby, which could promote their supplement intake. Therefore, rather than the cultural belief itself, understanding a woman’s perception about the belief seems to be more important in interpreting her behaviors of supplement use.

Nevertheless, specific attention is still required to women who may have challenges to acquire and consume the supplements resulting from other cultural issues: some needed to travel a long way or had to pass the “bad “areas to get to the CNC; some had their mobility restricted due to rigid cultural norms their family members abided by; and some practiced religious

observances strictly, especially fasting, that could last for a month even during critical periods of pregnancy. Inasmuch as the similar findings were also reported in the studies conducted in neighboring regions <sup>43,126,129,136,137</sup>, the understanding of area-specific culture remains important in this area.

Women reported that practical concerns directly influenced the use of the supplements, and such concerns need attention for better program implementation. The perception of poor appetite appeared to contribute significantly to the reduced food consumption among the pregnant women. This is noteworthy because, unlike previous studies where loss of appetite was described as a symptom of anemia <sup>70,98</sup>, in this study, poor appetite was perceived to be normal not just during the period of “morning sickness” but throughout pregnancy. Moreover, this contrasts with the pregnancy-related norm, “eating for two,” which is widespread in other parts of the world <sup>169,170</sup>. Inasmuch as a good appetite during pregnancy is known as a facilitating factor for nutrition supplement use <sup>20,70</sup>, the pervasive perception of lack of appetite observed here along with another prevalent belief that pregnant women tend to have small stomachs, may have contributed to the decreased intake of food supplements. This also implies that some women may have practiced “eating-down” for reasons other than the fear of having a big baby.

Household economic status is another factor that appeared to affect the use of the supplements. In this study, inadequate food in a household, mainly due to poverty, was mentioned as facilitating consuming supplements. Inasmuch as the potential positive relationship between the poor availability of food and the consumption of supplements has been mentioned only infrequently <sup>149,151,152,171,172</sup>, this finding adds more information useful for selecting target groups. Those who have decreased access to food will be more likely to adhere to the supplementation and hence may gain the benefits from nutrition programs. But poor economic



status was also described as a potential barrier to the consumption of supplements: a woman suffering from economic constraints may try to regulate her consumption of food and supplements to avoid having a big baby and thus an expensive delivery, such as a cesarean delivery. The concern over having a big fetus and the financial concerns of a complicated delivery were examined separately in previous studies <sup>92,126,129,130,136</sup>, but it is worth investigating how all of these factors actually relate to the use of the supplements.

To promote participation, this bidirectional influence of the household economic status on the use of supplements and the subsequent dilemma a pregnant woman might experience need to be considered when a program is designed. Similarly, possible conflict between the desire to have a healthy baby, which was perceived to be equivalent to a big baby, and the financial burden that can arise from the complicated delivery of a big baby needs attention as well. It should be noted that this study did not include an examination of whether or not economic status actually modifies pregnant women's consumption of supplements or their perceptions on having a big baby, and how these conflicts would be managed by pregnant women. These issues need further study.

Particularly notable in this study were women's reports of sharing the food supplements with other family members, mainly with their children. The women also revealed that they replaced their meals with food supplements as it has been observed as problems in other programs <sup>149,152-154</sup>. These are of concern not only because of their negative impact on the effectiveness of the nutrition program but also because of problems associated with program delivery. In spite of the efforts made by the program (by asking the pregnant women to come to the CNC every day to consume the food packets), sharing and replacement were still not preventable.

According to the women's reports, the main reasons for these behaviors were low food availability at home, which led the women to share the supplements with other family members or to substitute their regular meals for the supplements. The substantial size of the nutrition packet was another main reason for these behaviors. Because of the food package was too much for the women to finish at the CNC, they brought the left-overs home, which also led them to the sharing and/or replacement behaviors. The perception of poor appetite and the lack of education on the importance of maintaining women's usual diet while receiving the supplements appeared to contribute to these problems as well. This also raises concerns that the level of program delivery (acquisition of the supplements) may not directly reflect the degree of the target behaviors undertaken (actual consumption of the supplements) <sup>84,173</sup>. Similar issue was raised in a previous study such that attendance in a supplementation program did not explain the birth weight difference in babies while the amount of energy supplemented did <sup>174</sup>. Therefore future programs should include components to emphasize continuous education to support participants' understanding of the program objectives and relevant guidelines. More importantly, future programs should provide supplements in a more nutrient-dense form, hence reducing the volume of the supplement a woman needs to consume at one time. Ceesay et al. (1997) found that just two supplement biscuits were enough to provide pregnant women more than 1,000 kcal, which also made it possible for most of the participants to finish their assigned portions in the presence of birth attendants <sup>151</sup>.

Considering the other practical concerns presented in this study, the following strategies can be suggested to improve pregnant women's acquisition and consumption of the supplements. First of all, involving family members in the supplementation program by making them understanding and providing them with certain roles will enhance pregnant women's

participation in the program. Similar to the findings from previous studies about autonomy of women in Bangladesh <sup>38,129,131,135,136,175-177</sup>, husbands and mothers-in-law in this study acted as “gate keepers” <sup>178</sup> by making decisions for the pregnant women’s behaviors, including food consumption and permission to leave their houses. All of these could affect the women’s participation in the nutrition program as a similar influence of family members on the use of supplement was reported from a study conducted in India <sup>98</sup>. In this study, family members tended to have positive attitudes and support the women’s supplement-taking when they acknowledged the potential benefits of the nutrition supplements. Therefore, it will be crucial to help the family members to understand the purpose and the anticipated benefits of the program.

Specifically, utilizing the pre-existing roles of family members may be an effective way to create a social support for pregnant women’s participation. For example, helping the husbands to understand proper nutrition during pregnancy and teaching them simple strategies for food purchasing would facilitate their positive attitudes toward the supplements and their active support in their wives’ participation in the program. Similarly, by emphasizing their potential contribution to the health of their newborn grandchildren, mothers-in-law can be great supporters as they can help their daughters-in-law with house work or to keep track of taking supplements. With mothers-in-law, it would be also important to address the generational gap with their daughters-in-law. In particular, inasmuch as most mothers-in-law worried about potential problems in delivering a large baby, this concern needs to be addressed by the nutrition program to help mothers-in-law to acknowledge and support that the pregnant mother eats enough to deliver a healthy baby.

Reassuring the role of health professionals will be another strategy as many women and their family members described the critical roles of these professionals in understanding and

participating in the program. The results of this study agree with those of previous studies that showed the importance of health care workers in providing motivation and encouragement for the use of nutrition supplement <sup>11,17,104,157,162,179</sup>. Inasmuch as, in this study, there were women who were not informed about the specific guidelines or the benefits of the supplements by health professionals including community nutrition workers, training the health professionals in the delivery of essential messages of the program should be ensured.

Moreover, as suggested by others, <sup>11,25,67,105,180</sup>, motivating them in their roles as program deliverers needs to be emphasized. In clinical settings, it has been found that a co-operative doctor-patient relationship increases the patient's compliance to the prescribed treatments because it helps the patient's cost-benefit analysis when they are deciding whether or not to follow the prescriptions <sup>24,64,181,182</sup>. Despite differences between nutrition supplements and medical treatments, as suggested in a few studies <sup>17,26,37,183,184</sup>, it is still important that the program deliverers should try to understand the participants beliefs and circumstances and to provide enough information through proper communication so that the participants are able to make right decisions about taking the supplements.

It is important to address the gap between the women's perceptions of the anticipated benefits of the supplements and the benefits they actually experienced. Although it has been reported that the experienced benefit of taking iron tablet would facilitate further consumption of supplements <sup>17,70,98</sup>, quite a few women in this study stated that they experienced no benefit or worse-than-expected effects. This lack of acknowledged impact because of women's ignorance or low impact of the supplements could negatively influence the perceptions of the program not only for individuals but also for the community as a whole, and may hinder the future participation of pregnant women in the region. From the findings of this study, it can be assumed

that inadequate consumption of the supplements, possibly resulting from sharing the supplements and replacing daily meals with the supplements, could be one of the reasons for these negligible or negative effects <sup>11,25,150,152,172</sup>. Therefore, the relationship between the amount of the supplements the women consumed and the perceived benefit of the supplements needs to be investigated and then appropriately addressed.

Providing the participants with feedback on the progress in their nutritional status through proper monitoring may be another way to address the less-than-anticipated effect as the women might not recognize the benefit they actually gained. For example, helping them to acknowledge any monthly weight gains or relief from various symptoms after taking the supplements will be helpful. Inasmuch as anemia and consequent feeling of weakness were great concerns of the women <sup>70,98</sup>, emphasizing any progress in these symptoms will be beneficial as well. In addition, sharing case stories of women who had a positive experience with the supplementation program would encourage others to participate.

Another strategy to consider is acknowledging and reinforcing the will of the women to make independent decisions. As pointed out previously, the pregnant women in this study appeared to have limited power to make decisions in their homes. Some women did not follow other people's advice blindly, however, particularly regarding decisions that may affect their fetuses. Some women were even willing to go against the will of family members to follow what they thought was right. This shows that, despite many cultural and social restrictions, pregnant women still possess autonomy and might act as the primary decision-makers in consuming nutrition supplements. To help these women to make decisions, enhancing their awareness of the health risks and the potential benefits of the supplements is essential, as indicated previously <sup>17,26,70,101,184</sup>. Particularly, as suggested in other studies <sup>17,98,101</sup>, those who understood the

potential benefits of the supplements tried to increase their consumption even when they experienced difficulties, including side-effects, reduced appetite, and the negative attitudes of family members toward the supplements. Therefore, convincing the women of the necessity of taking supplements will be one important strategy to facilitate their active participation in the nutrition program.

There are some limitations in this study. First of all, the interviews were conducted a few years after the women participated in the supplementation program, so the interviewees may not have recalled their experiences precisely. When they were asked about the program and their participations, however, most of the women answered confidently and provided accurate specific details, such as the time and place of the service, the ingredients of the food package, and delivery system of the two different supplements. Secondly, because the principal investigator could not speak Bengali, the interview transcripts were translated into English, which might have limited the understanding of cultural features. To overcome this, the voice recordings and the transcripts were checked by others who had not been involved in transcription process. The translations were also checked both with the recordings and the transcripts. Culture-specific terminologies were included verbatim as well. Another limitation is that, although the interviewers tried to secure a private place for the interviews, some of the interviews conducted in the homes of in-laws were frequently interrupted by family members, while the interviews conducted in the home of the pregnant woman's parents went smoothly. This difference in the environment of interviews might have affected the responses of the pregnant women because some of them might not have felt secure to share their personal experiences. But through probes and repeated questions, the interviewers tried to elicit accurate information from the women as much as possible. With regard to the number of the interviewees, although this study interviewed

only 24 women, theoretical saturation was reached for the main findings. Finally, as the present study was conducted in a rural area of Bangladesh, the findings cannot be generalized for other populations, even for urban areas of Bangladesh.

This study provides important information on the potential relationships between unique cultural factors and the acquisition and consumption of nutrition supplements among pregnant women in Bangladesh. To confirm these relationships and to estimate the extent to which facilitators or barriers influence the use of supplements, further research, including both qualitative and quantitative studies, are required. Particularly, comparing the effect of these factors according to the different level of acquisition and consumption of the supplements will enhance the understanding about the participants' behaviors, and hence inform practical concerns for improving the design and the implementation of the supplementation program.

## **Chapter 4. Intra-cultural diversity and development of a theoretical model**

### **4.1 Intra-cultural diversity**

Although it is difficult to find a common definition <sup>117</sup>, culture is generally perceived as a representation of unique patterns of beliefs and behaviors shared among particular groups of people <sup>117,164</sup>. Thus, when describing a culture, these shared patterns are searched for by assuming that people's thoughts, ways of life, values, norms, practices and customs are homogeneous across the group. In reality, however, it is also easy to find that an individual's perceptions and lifestyles tend to branch out from the common cultural features and add variations to them. Therefore, along with the uniform presentations of a culture, it has also been emphasized to consider this intra-cultural diversity to improve understanding of differences in people's behaviors <sup>164,185,186</sup>.

As presented in Chapter 2 and Chapter 3, the pregnant women in this study also revealed both uniform and diverse cultural components that affected their participations in the nutrition supplementation program. Some features, such as fear of *Alga* and mothers-in-law's control over the women's lives, were commonly described by the interviewees and their effects on the women's behaviors were consistently influential. In contrast, intra-cultural variations were observed concerning appetite during pregnancy. Although the majority of the women perceived that poor appetite was a general figure of pregnancy, the perceptions regarding the duration of and the reasons for the reduced appetite varied. Some women experienced the decline of appetite only in early stage of their pregnancy, while many others perceived that it lasted for the entire gestational period. Some thought that the space for the stomach would be decreased as the fetus



grew, which resulted in the decreased appetite. Others reduced their intake not only due to the poor appetite but also they felt better if they ate less. There were also some women who tried to eat more for the health of their babies even though they experienced the lack of appetite.

Among the cultural features with variations, some showed bidirectional influences on the women's participation. For example, in the case of perceptions of having a big baby, some women were concerned about the size of the baby because a large baby could cause a caesarian delivery or unexpected problems during delivery, which led them to decrease their food consumption, including food supplements. Others, however, thought that a big baby was equivalent to a healthy baby and hence preferred to have a baby of a larger size, which promoted certain health behaviors of mothers, including taking supplements. Similarly, other factors, such as role of family members, role of program providers and health professionals, pregnant women's attitudes toward the supplementation program, and poor economic status of the household, also either facilitated or hindered the women's participation in the use of nutrition supplements.

Although it is hard to generalize about the direction of the influence of these factors, it is possible to find potential strategies to improve participation by examining the cultural variation. For instance, some families facilitated women's participation by providing social support, such as helping with household chores, encouraging program participation, or reminding them to take their supplements. In contrast, some women's family members, husbands or mothers-in-law in particular, prevented the women from going to the community nutrition center (CNC) for various reasons. It turned out that when family members learned the potential benefits of supplements, they tended to have a positive attitude towards the supplements and encouraged the pregnant women's participation in the program. Therefore, helping family members to understand the

importance of taking prenatal supplements is a potentially useful strategy to elicit their positive roles in improving women's participation in a nutrition supplementation program.

Similarly, ranges of perceptions regarding the supplements affected the participation either positively or negatively. Particularly, women who experienced less-than-expected benefits from the supplement tended to report reduced consumption of the food supplements, sharing the supplements with others, and replacement of their regular meals with the supplements. One thing learned from these women, however, was that their expectations were too broad to be confirmed. For example, many of them who expected to be healthy or feel better after taking the supplements, mostly evaluated the benefits of taking supplements based on subjective sensation without further description about what they meant specifically. Some of them also mentioned only side-effects of the supplements when they were asked about benefits, indicating that they did not distinguish benefits from side-effects.

In contrast, there were other women who acknowledged the potential benefits of the supplements. Most of these women either experienced positive effects of the supplements or were educated well about the benefits of taking supplements by health professionals and community health workers. Some of these women even tried to consume the supplements while ignoring preexisting perceptions, such as poor appetite during pregnancy. Some overcame other barriers like side-effects.

Many of the women emphasized their understanding about the program and the supplements for a better participation, and those who did not experience benefits from the supplements tended to be ignorant about the specific effects of them. As a result, efforts sufficient to make the participants recognize the positive effects of the supplements would be another strategy to increase the women's awareness of the nutrition supplementation, which

could eventually affect their program participations.

Addressing economic concerns, particularly financial burdens for caesarian deliveries, fostering the role of program providers as both encouragers and information providers, and supporting women to perceive themselves as the primary decision makers were other potential strategies learned from the women who shared promoting effects of cultural factors on their participation. Inasmuch as factors with bidirectional influences show that it is not impossible for the negative influences to be changed to favorable ones, the efforts to identify facilitators and to reinforce them will contribute to reducing barriers and improving participation.

Examining intra-cultural diversity also makes it possible to discover contextual factors that are not readily identified from a stereotypical cultural description but are important to explain differential behaviors of individuals <sup>185,186</sup>. In this study, even though most of the women would be classified as a seemingly homogenous group with a low socioeconomic status in a rural area of Bangladesh, their use of the supplements differed greatly. Among factors presented in the previous chapters, women's own perceptions of weakness, family members' attitudes and women's expectations toward supplements, characteristics of household, women's mobility, women's concerns related to delivering a baby and their trust in program providers can be considered as potential contextual factors to elucidate these various behaviors of the program participants.

The case of observing religious practices, specifically the fasting during the month of Ramadan among Muslims, shows the importance of considering the contextual factors to understand variations in participations behaviors. In spite of the exemption for the pregnant women, it has been reported that many pregnant Muslim women chose to follow the fasting during the month of Ramadan <sup>187-189</sup>. Thus, without taking account of this practice, it would be

hard to explain specific participation behaviors of the women who skipped consuming supplements to observe the fasting.

Moreover, even among Muslim women who decided to follow the Ramadan fasting, their supplement consumption varied according to other important contextual factors, such as the role of mother-in-law's role, family support, and economic status of the household. For example, some women's family members could have prohibited her from going to the CNC because eating was prohibited at the time when the food supplement was served during Ramadan. Or if there was a woman whose mother-in-law allowed her to receive a food supplement packet for the day, she could have kept it until after sunset when eating was permitted and then consumed it. Although a woman who followed Ramadan fasting received the food packet and kept it until night, if she had had five children who were hungry because of lack of food in her household, the woman might have fed the food packet to her children and, thus, would not have consumed it herself.

Likewise, variations in women's behaviors regarding supplement consumption can be more comprehensively explained by considering as many contextual factors as each woman had. In addition, because these factors are variable among individuals and intertwined with one another, it is also necessary to investigate important contextual factors affecting the participation behaviors across individuals, which requires more systematic and complicated analysis as presented in the next chapter. Contextual factors learned from intra-cultural diversity can provide information about what to be concerned to draw successful involvement of program participants. Moreover, an effective delivery of a program is possible by tailoring the services to participants appropriately.

## **4.2 Development of a theoretical model**

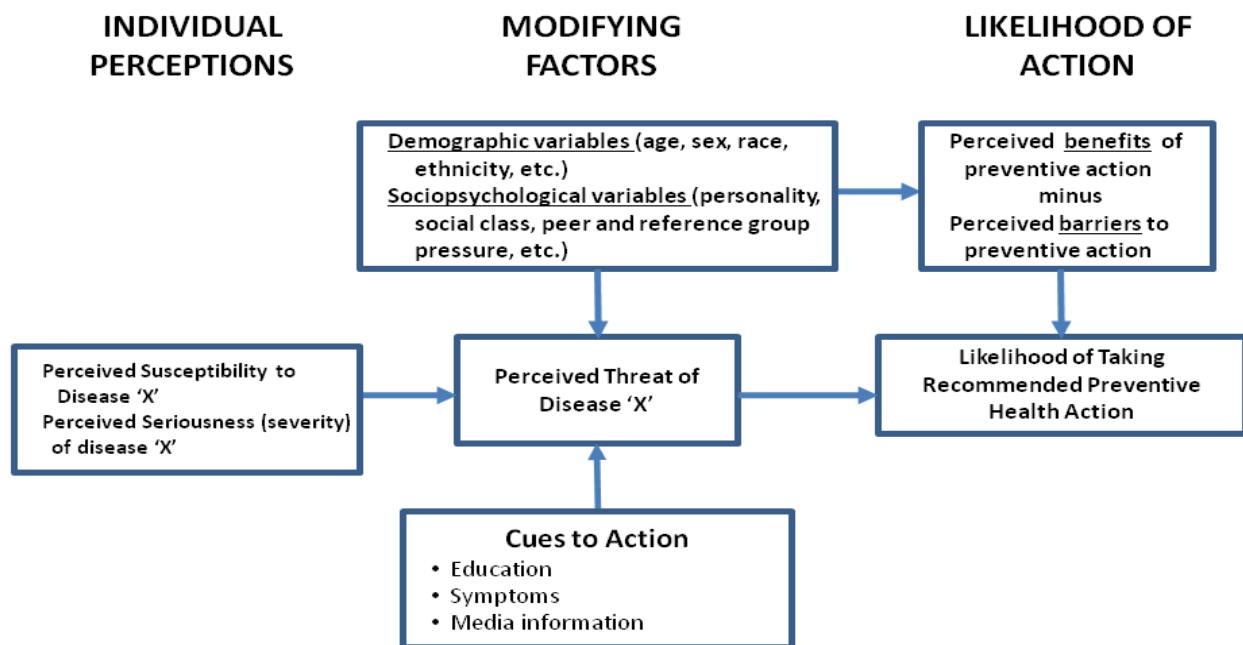
In addition to the identification of factors of importance, examining the relationships of these factors to one another will add more insights to understand the participant behaviors. As discussed previously, several cultural factors appeared to be meaningful to consider when understanding pregnant women's participation in nutrition supplementation programs. It was not the effect of each factor, however, but rather combinations of them that eventually make it possible to understand women's participation in a program. Examining all these complicated relationships requires formulating a theoretical hypothetical model for a rigorous analysis assuming that the observed behaviors of the women can be better explained by considering relationships among factors collectively. This being said, the main findings from the qualitative analysis of this study provide valuable information to be considered for further analysis. These includes not only external factors, including demographic characteristics, environmental factors, and program delivery features, but also intrinsic personal factors, such as beliefs, perceptions, attitudes, intentions or motivations.

As the first step for developing a hypothetical model for this study, several psychosocial theories widely used to explain health-related behaviors were examined. These include health belief model (HBM) <sup>78</sup>, social cognitive theory (SCT) <sup>190</sup>, theory of reasoned action (TRA) <sup>79</sup>, theory of planned behavior (TPB) <sup>165</sup>, and self-determination theory (SDT) <sup>191</sup>. Then, constructs emphasized repeatedly across the theories were examined to see if they corresponded to the main themes emerged from the qualitative analysis of this study.

Constructs found to be linked to the study findings are perceived susceptibility, modifying factors, cues to action, motivational factors, and perceived benefits from HBM <sup>78,192</sup>; belief or attitude about the behavior, opinions of referent others, motivation to comply, and

subjective norm from TRA and TPB <sup>79,165</sup>, perceived behavioral control from TPB <sup>165</sup>; cognitive personal factors, environmental factors, behavior factors, and self-efficacy from SCT <sup>193-195</sup> and contextual factors, including provision of rationale, acknowledgement of the participant's perspective, and opportunities for choice, from SDT <sup>191</sup>.

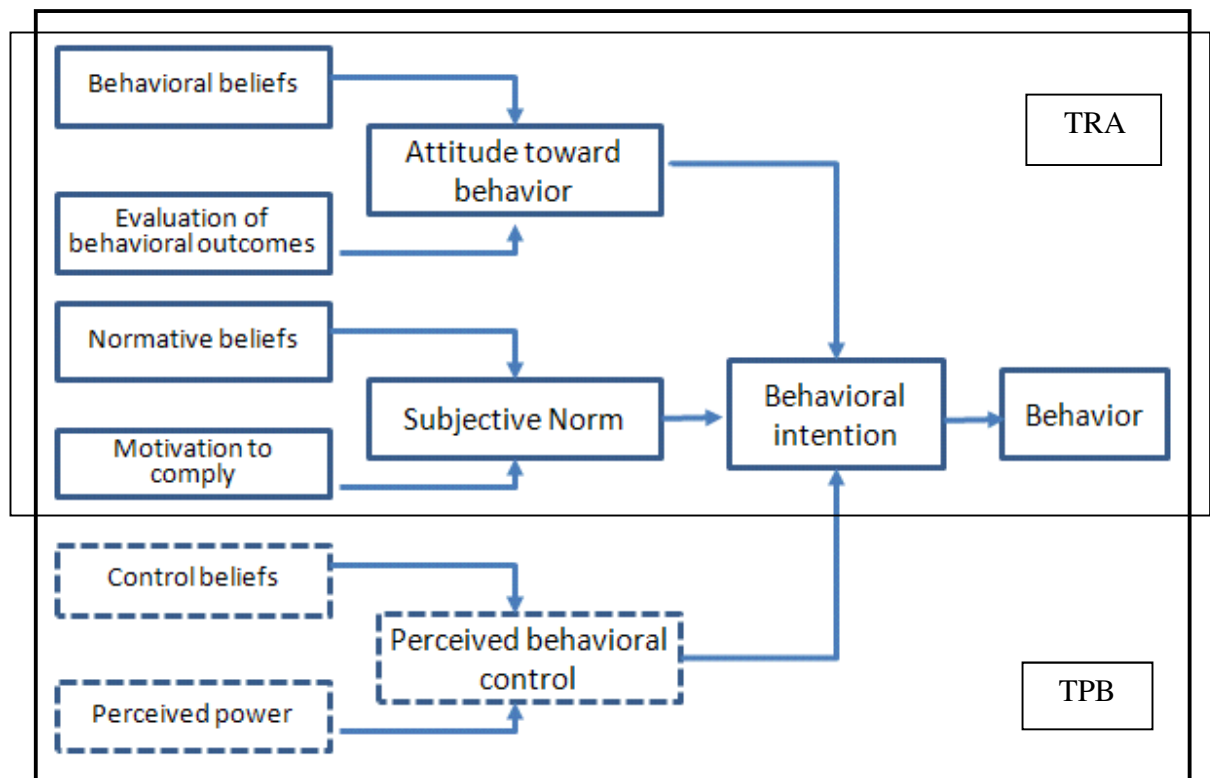
In HBM, perceived susceptibility refers to an individual's perception of the level of vulnerability or risk of having a health-related condition <sup>196</sup>. Modifying factors includes demographic and socio-psychological variables while cues to action refer any stimulus that makes the person to take action <sup>78</sup>, such as advice from others, health professional's explanation, sensation of changes in body, and so on (Figure 4-1). Motivation is an additional construct used for explaining compliance behavior of patients and includes physical threat, control over health matters, attitude toward medical authority, and general health concern <sup>192</sup>.



[Figure 4-1] The Original Formulation of the Health Belief Model <sup>78</sup>

Attitude and subjective norm are two important constructs of TRA and TPB (Figure 4-2).

Attitude means an individual's evaluation on the behavior of interest and is a function of the belief that the behavior will result in certain outcomes and the value attached to the outcomes<sup>74,79</sup>. Similarly, subjective norm refers to the perceived social influence on performing the recommended behavior. It is determined by the normative belief, which means the participant's belief about whether each person of social influence thinks that the participant should or should not take action, and the degree of motivation to comply to each referent<sup>74,79</sup>.

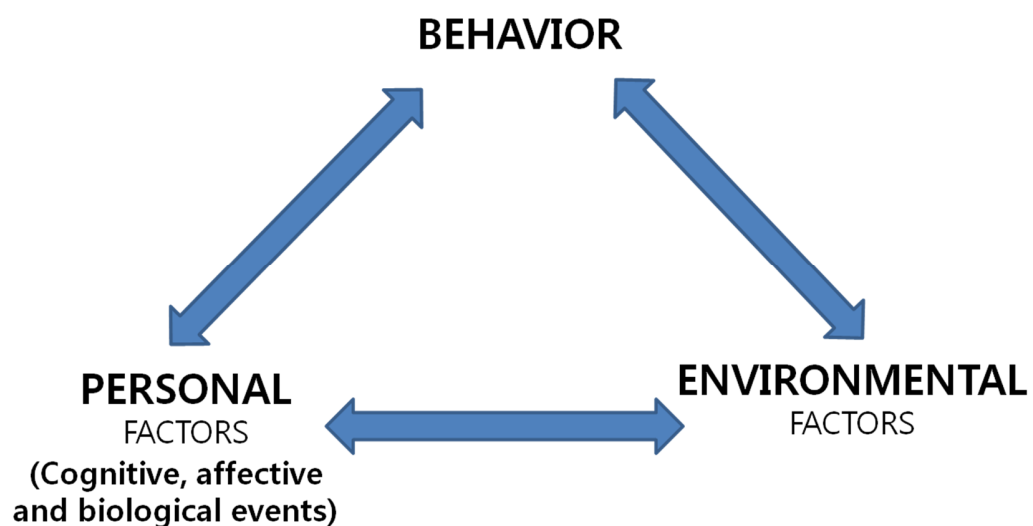


[Figure 4-2] The Theory of Reasoned Action and Planned Behavior<sup>74</sup>

The model of TPB has another component (Figure 4-2), perceived behavioral control, an individual's perception about his/her control over the behavior of interest. The two components that determine the perceived behavioral control are control belief and perceived power, which

means the perceived facilitators and barriers to perform the behavior and the perceived power of each of these facilitators and barriers on performing the behavior respectively <sup>165</sup>. According to the model of TRA and TPB, attitude, subjective norm, and perceived behavioral control affect the intention to take action. Then if an individual has an affirmative intention, it will eventually lead the person to perform the behavior <sup>165</sup>.

SCT assumes that human behaviors are determined by triadic and reciprocal interactions of personal factors, behaviors and environment (Figure 4-3). Specifically, personal factors include expectations, beliefs, self-perceptions, intentions, emotions, and cognitions while environment refers to both physical and social conditions that affect the person's behaviors <sup>190</sup>. Self-efficacy, which means the personal perception that one can successfully execute the behavior to produce the expected outcomes, is one of additional constructs of SCT that are closely related to the main three components in the triadic relationship <sup>195</sup>.



[Figure 4-3] Social Cognitive Theory – Triadic Reciprocal Determinism <sup>194,197</sup>

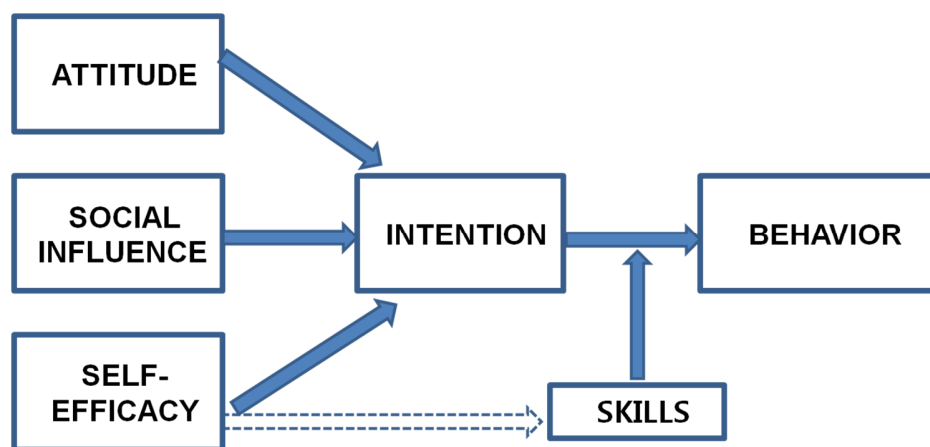


According to the SDT, the three contextual components, provision of rationale, acknowledgement of the participant's perspective and opportunities for choice, facilitate the internalization of a behavior <sup>191</sup>. In the SDT, internalization refers to the transformation of external regulations into internal ones such that a successful conversion would lead to the integration of the behavior into one's self to the extent to which the person would no longer recognize it as external <sup>191</sup>. When these contextual factors are supportive, they promote motivation that plays as a base for internalization and integration and thus is required for not only to initiate a behavior but also to maintain it persistently <sup>191,198</sup>. Providing rationales that would be meaningful to the actor would help the person recognize the behavior as useful to him or her. Acknowledging the conflicts, the person may face when performing the behavior of extrinsically motivated, would alleviate the tension from the conflicts by legitimating the person's feelings. The third contextual component, opportunities for choice, refers to the way to convey the first two contextual factors. In other words, rather than giving pressure to the person when the rationale and the acknowledgement are presented, it means to use skills, for example verbal expressions without strong modal like should, must, etc., to make the person feel to choose to take action <sup>191</sup>.

The main themes revealed to affect the women's participation in the qualitative study (Chapter 2 and 3) showed close relationship with the constructs from these theories. For instance, cultural beliefs, such as poor appetite and vulnerability of pregnant women to evil spirit, were related to subjective norm of TRA and TPB, perceived susceptibility of HBM, and environmental influences of SCT. Another example is that the expected and experienced benefits of the supplements were associated with outcome expectations and attitude of HBM, TRA, TPB, and SCT. Similarly, the influences of family were linked to social influence, subjective norm, and

economic factors while perceptions about the supplements to perceived benefit, attitude, and program factors of HBM, TRA/TPB, and SCT, respectively. Women's intention to take supplements corresponded to intention of TRA/TPB while their confidence in behaviors was related to self-efficacy of SCT. More importantly, information provided by the program providers, opportunity to make decision by the women, and acknowledgement of their concerns and feelings correspond to the contextual factors of SDT.

The attitude-social influence-efficacy model (ASE) is one of the models that integrated TRA and SCT <sup>199</sup>. Although the model has three main psychosocial components similar to TPB, DeVries et al (1988) substituted self-efficacy for perceived behavioral control from TPB to emphasize the cognitive perception about the capability to perform the behavior of interest <sup>199</sup> (Figure 4-4).

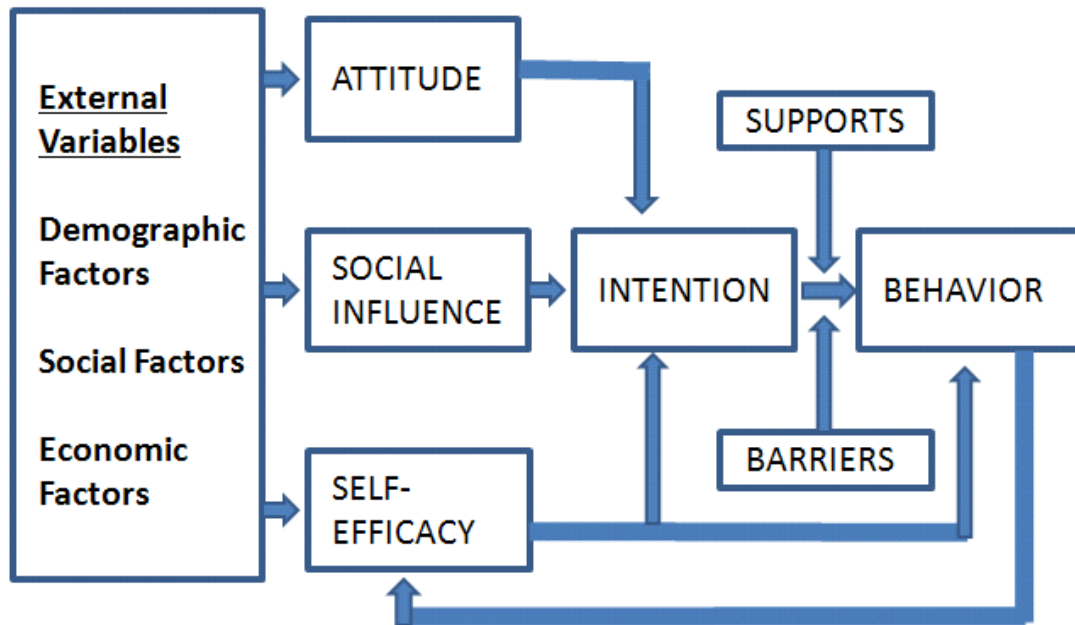


[Figure 4-4] The Attitude-Social influence–Efficacy Model <sup>199</sup>

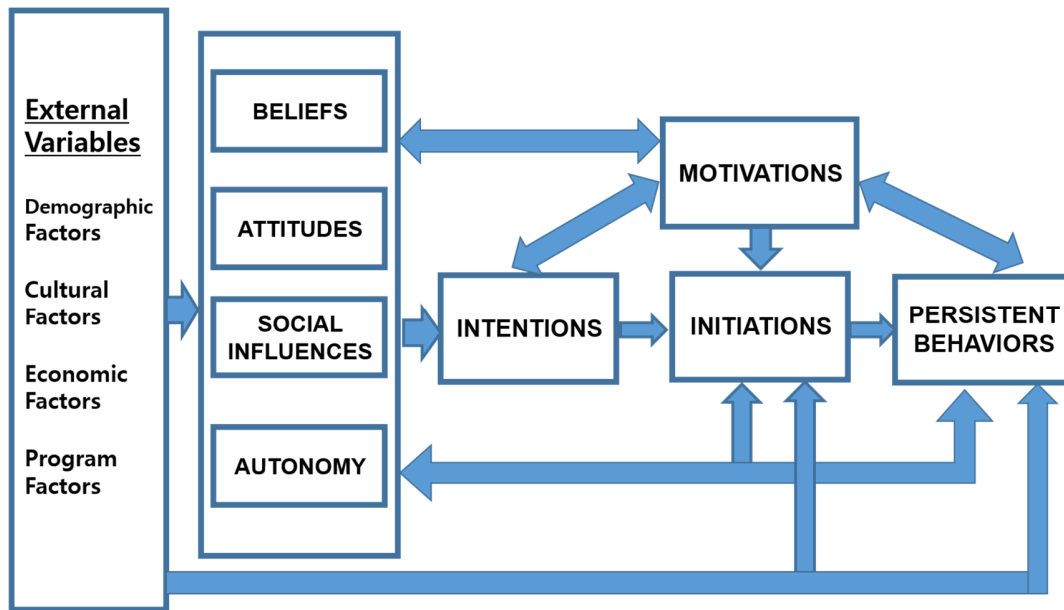
Later, Amooti-Kaguna and Nuwaha (2000) added more components, including external variables, supports, and barriers, to the original ASE model to explain behaviors related to selecting a birth place <sup>200</sup> (Figure 4-5). This modified ASE model provided the base for

developing the hypothetical model for this study as it encompasses many of the constructs of concern.

[Figure 4-5] The modified Attitude- Social influence – Efficacy Model <sup>200</sup>



Additional modifications were made to develop a model optimized for the context of this study (Figure 4-6). Belief was added as the fourth psychosocial construct for predicting participants' intention to take action. Belief in this model needs to be distinguished from the one from TRA and TPB that means outcome expectancy. Rather it represents the perceived susceptibility of participants in relation to nutritional problems as used in HBM. Therefore, fear related to delivery, more specifically to death, physical weakness, morbidity during pregnancy, fear of contracting evil spirit, and other cultural beliefs indicating negative signs of pregnancy can constitute this component.



[Figure 4-6] The theoretical model for the present study

Women's autonomy replaced self-efficacy of the original ASE model even though these are two different concepts (Figure 4-6). One of the reasons for including women's autonomy was related to persistency in taking nutrition supplements. Inasmuch as pregnant women were required to take nutrition supplements for a relatively long period, they needed to be determined to consume the supplements to attain the intended effects. According to the SDT, motivation is crucial to maintain changes in behaviors persistently<sup>191</sup> and autonomy is one of the factors that make this possible<sup>191,198</sup>.

Another reason for including autonomy in the model was that the women interviewed in this study mentioned autonomy-related issues rather than self-efficacy when they shared cultural practices and supplement uses. This can be interpreted as that consuming supplements might not have been perceived as a complicated action like other health behaviors that require self-efficacy<sup>201-203</sup>. Additionally, autonomy-related issues could have been more obstructive to their supplement consumption and unsolvable than matters associated self-efficacy, particularly in

acquisition of food supplements. Finally, autonomy was included instead of self-efficacy because the data that were used for the quantitative analysis did not have information regarding self-efficacy but variables that constitute women's autonomy were available.

For the external variables, demographic, cultural, economic, and program factors were included (Figure 4-6). With regard to demographic variables, even though they cannot be changed, their relationships with other constructs can provide useful information for defining target groups in the future intervention, more specifically sub-group of people who will need more tailored services to improve participation <sup>62</sup>.

Cultural and economic factors were added to reflect the importance of their influences on the use of nutrition supplements, revealed by the pregnant women in this study. Although some cultural features could have been addressed when the psychosocial constructs were considered (particularly those factors closely related to internal components of participants, such as beliefs and perceptions), cultural factors still needed to be included as independent factors to encompass cultural features that externally affected participation behaviors and were not represented by other constructs in the model.

Program factors were also included as the external variables because many women in this study mentioned features associated with program delivery as important facilitators or barriers to their use of nutrition supplements. Similar results have been reported by other studies showing that, by and large, program-related features need to be considered when participation in nutrition supplementation is concerned <sup>22</sup>. Among them, problems in distributions and supply <sup>25,67,70</sup>, low coverage of target people <sup>8</sup>, attitudes of program providers <sup>11,102</sup>, and access to services, including distance to the service center <sup>67,70</sup> are specific program delivery-related issues meaningful to consider under this study context.

Not only considering external variables separate from psychosocial constructs but also regarding external variables as the underlying factors of the internal variables, this modified model makes it possible to consider both direct and indirect influences of external variables on behaviors. Moreover, by compartmentalizing potential determinants into extrinsic and intrinsic variables, it also provides a platform to focus on individuals' cognitive and inner factors, which in turn makes it feasible to understand pregnant women's behaviors from their perspectives.

Motivation was another construct added to the ASE model for this study. Basically, 'intention' in the model is supposed to encompass the concept of motivation to a certain degree<sup>167</sup> as it reflects a person's volition to enact the behavior of interest. In this study model, however, motivation was incorporated as an independent construct to highlight that it is an important concept across HBM, TRA/TPB, and SCT such that they are so called 'motivational models' among psychosocial models<sup>167,192,198,204,205</sup>.

Another reason for representing motivation explicitly in the model was to consider the fact that pregnant women need to be persistent to consume nutrition supplements for a relatively long period, which can be facilitated by proper motivation<sup>11,24,25,198</sup>. Inasmuch as taking supplements is not a behavior intrinsically motivated (although important), a successful use of supplements is possible when the behavior is internalized, which means the participants transform the external requests from program providers into internally accepted and thus self-determined ones<sup>191</sup>. Hence, motivation is a critical component for the participants to show high degree of willingness to exert full responsibility toward the behaviors of concern with a concrete understanding about the value of their actions<sup>191</sup>. Moreover, various factors can affect the motivation and motivation itself can affect not only behaviors of interest but also other psychosocial constructs. Therefore, it would be meaningful to consider these relationships in the

model to understand participation behaviors.

Finally, in the model to be used in the quantitative analysis (Figure 4-6), participation behaviors were divided into two components, initiation and utilization. Initiation means whether or not a pregnant woman ever started to consume the nutrition supplements while utilization indicates how much a woman followed the supplementations compared with what she was assigned to. The main reason for modeling outcome behaviors separately was to reflect the complexity of participation behaviors to a certain degree. Although participation in a nutrition supplementation is composed of very different actions<sup>52</sup>, from enrollment to actual consumption of supplements, what previous studies typically reported or investigated was limited to average adherence rate to nutrition supplementation<sup>17,28,29,33,72,150,154-157,159,171</sup>. Therefore, it would be meaningful to differentiate participation behaviors even at the two levels and examine factors affecting these behaviors, respectively. Moreover, it would provide a chance to identify characteristics of participants who agreed to join a program but did not actually participate, which was investigated mainly for demographic variables in other studies<sup>17,18,20,71</sup>. Inasmuch as two different types of supplements were provided jointly in the present study, differential behaviors across the two supplementations at different levels of outcome behaviors also can be examined, which will contribute to understand behaviors comprehensively.

The theoretical hypothetical model developed for the present study was used as a framework to conduct systematic and thorough analysis to identify factors influencing program participation and the relationships between these factors. By doing this, it will be possible not only to elucidate participation behaviors of the pregnant women in this study but also determine what needs to be done to improve participation of pregnant women in nutrition supplementation programs.

## **Chapter 5. Factors affecting participation behaviors related to the separate and combined use of food and micronutrient supplements in rural Bangladesh**

### **Abstract**

Less than expected effectiveness of a community-based nutrition supplementation program is problematic. Low participation has been known to contribute to the low effectiveness, which requires research on participation and its associated factors. A quantitative analysis was conducted by using data from Maternal Infant Nutrition Interventions at Matlab (MINIMat), a randomized controlled trial that provided both food micronutrient supplements to 4,436 pregnant women. Information on participants characteristics, their experiences on taking nutrition supplements, and program features were collected through extensive questionnaires. Potential factors associated with participation were selected based on a theoretical psychosocial model. Supplement consumptions were monitored monthly and levels of participation were examined in terms of initiation, duration, intensity, pattern, and persistency of utilizing the food, micronutrient, and combined supplements. Both crude and adjusted analyses were conducted to identify factors associated with participation behaviors then a model was selected to explain each behavior. In general, MINIMat participants utilized micronutrient more than food supplementation when provided simultaneously. Sharing of the food packages with others and replacing home meals with the food supplements were prevalent. Participants who started food before micronutrient supplementation showed better participation. Only 10% of the total participants consumed both types of nutrition supplements persistently. Women in the ‘early’ food group where program provider’s active recommendation on food supplements consumption occurred showed greater participation in all measures. Strong cultural perceptions and practices were negatively associated with food supplementation, while women’s autonomy showed positive relationships. Greater utilization of micronutrient supplementation was related to positive perceptions and attitudes toward supplementation. Influences of husbands on pregnant women’s consumption of supplements were also positively associated with consumption of both types of supplements. Therefore, when food and micronutrient supplements are provided



simultaneously food supplementation needs more attention for persistent participation. Pregnant women's cultural concerns and perceptions on supplements need to be addressed properly along with efforts to enhance women's autonomy and understanding about supplementation to improve effectiveness of a nutrition supplementation through better participation.

## 5.1 Introduction

Participation behaviors of pregnant women in nutrition supplementation programs have been emphasized because less-than-expected consumption of the assigned supplements could undermine the outcomes of supplementation by resulting in false negatives<sup>3,8,9,11,14,17,22,23,25,26,28,37,66</sup>. Numerous studies have been conducted to determine factors that affect uptake of nutrition supplements, but the majority of them were focused on consumptions of iron pills.

With regard to iron supplementation, previous studies have found that some factors were possibly associated with low consumption among pregnant women, including insufficient service delivery, adverse side-effects, lack of perceived benefit, lack of motivation of health workers and recipients, cultural beliefs and other personal characteristics<sup>3,11,20,22,24,25,37,67,70,98,206</sup>. Although efforts to modify these factors have been made to increase the consumption of iron pills by reducing side-effects<sup>21</sup> and frequency of taking pills<sup>20,22,46,72</sup>, or reinforcing education<sup>26,105,183,207,208</sup>, the low uptake of micronutrient pills still needs to be resolved<sup>206,209-212</sup>.

Moreover, factors that affect utilization of food supplementation (FS<sup>2</sup>) are poorly understood<sup>20,37,62,68,73</sup>. In addition, inasmuch as a nutrition supplementation requires behavior changes of participants, it is imperative to elucidate the integrated influences of various factors

---

<sup>2</sup> Used as an acronym for food supplementation

based on a theoretical model that has been shown to explain participation behaviors, which has been done in only few studies previously <sup>98</sup>. This is particularly important as it has been known that a combination of strategies works better than a single approach in attempts to increase medical compliance <sup>20,21,24,67,70,98,102-104</sup>. Inasmuch as many community programs for pregnant women are implemented as a combination of different types of interventions <sup>105,106</sup>, it is also worth examining differential participation behaviors and factors that influence utilization of nutrition supplements when different types of supplementation are provided simultaneously. Therefore, identifying more factors that explain the level of consumption of supplements and examining the influences of these factors in a complicated supplementation are necessary to understand pregnant women's participation behaviors in a nutrition supplementation programs comprehensively <sup>20,21,24,67,70,85,98,102-104</sup>. This will also make it possible to find more modifiable and feasible targets for interventions to improve the uptake of nutrition supplements.

Participation behaviors in a nutrition supplementation programs are not limited to consumption of the supplements but rather encompass a series of actions, including consent to participate, initiation of supplementation, and utilization of supplements, which also involves acquisition and consumption. As for consumption, in addition to the absolute amount of supplements consumed, how persistently a woman consumed the assigned supplements can be of interest, and includes duration, intensity, pattern of consumption and pregnancy period covered by the supplement consumption. Moreover, unplanned behaviors, such as sharing the supplements with others, throwing them away, or replacing the diet with supplements, also are worth consideration. Although it is important to understand these various behaviors to improve uptake of nutrition supplements and hence the outcomes of nutrition supplementation, previous supplementation programs either ignored the level of participation or only reported average

proportion of the number of consumed to the number of assigned supplements<sup>20,28,67</sup>. Therefore, it is meaningful to examine these behaviors and their associated factors to predict or explain pregnant women's behaviors in a nutrition supplementation program comprehensively.

Maternal and Infant Nutrition Interventions, Matlab (MINIMat) provides excellent conditions to examine all these features because more than 4,000 participants were enrolled and extensive information was obtained, two types of supplements (food packages and micronutrient pills) were provided simultaneously but with a staggered start, and comprehensive participation data that allows examination of various behaviors, were available<sup>107</sup>. Moreover, the consumption of the supplements varied considerably among participants<sup>107</sup>, which justifies the efforts to identify factors resulting in the ranges of participation behaviors.

Therefore in this chapter, various participation behaviors of pregnant women in a nutrition supplementation experiment, including differential behaviors toward two different types of supplementation, were examined by using data from MINIMat. Factors that affect these behaviors were identified and their association with participation behaviors were examined based on the psychosocial model developed in the previous chapters.

## **5.2 Methods**

This study used data from the MINIMat, a large, randomized, controlled trial of pregnancy supplementation conducted in Matlab, Bangladesh, from 2001 to 2004<sup>107</sup>.

### **5.2.1 Study setting**

Matlab is a poor rural sub-district (*upazilla*) in the east central part of Bangladesh. The ICDDR, B. provides community-based health services to half of the Matlab area and has

operated an extensive Health and Demographic Surveillance System (HDSS) since 1966. Four sub-centers, which serve 25,000 – 30,000 people each, provide sick child management and reproductive services with a staff of two medical assistants, one family welfare visitor and one nurse-midwife. In the villages, female Community Health Workers (CHW) provide reproductive and child health services such as family planning, treatment of diarrhea and respiratory infection, education and counseling. They also collect surveillance data during their monthly household visits. Although a substantial decrease in maternal mortality in Matlab was reported: from 600 deaths per 100 000 livebirths in 1976 to 163 per 100 000 livebirths in 2005<sup>213</sup>, low maternal body weight and low birth weight are still common in this area.

### ***5.2.2 Study subjects***

All pregnant women, identified at 6-13 weeks of gestation through monthly visits by CHW between November 2001 and October 2003, were invited to the MINIMat study. If a woman reported that her menstruation was overdue or she was pregnant, a pregnancy test and an ultrasound examination were conducted subsequently to confirm the pregnancy and the gestational age. After excluding women with illnesses, including those with very low hemoglobin concentration ( <80g/L), or gestational age over 14 weeks, a total of 4,436 pregnant women entered in the study by giving their verbal informed consents.

### ***5.2.3 Intervention***

After the enrollment, women were randomly assigned to one of six intervention groups. Food supplements (Fs<sup>3</sup>) with two schedules ('early' vs. 'usual') and three different kinds of

---

<sup>3</sup> cf. FS (Food Supplementation)

micronutrient supplements (MNs<sup>4</sup>) were administered to participants in a 2x3 factorial design. With respect to FS, women in the “early assignment” group were strongly encouraged to contact the local community nutrition promoter (CNP) to start their FS immediately after the confirmation of their pregnancies. In contrast, the “usual assignment” group was invited to start their supplementation at about the same time as with the ongoing national program of Bangladesh and no encouragement from CNP was provided. All women were provided FS packets of 608 kcal/d containing roasted rice powder (80 g), roasted lentil powder (40 g), molasses (20 g), and soy oil (12 mL). Participants were told to consume the supplements at the local community nutrition center (CNC) for six days a week until delivery. At the clinic visit at 14 weeks of gestation, all enrolled pregnant women received one of three different combinations of micronutrients pills: (i) 60 mg iron plus 400 µg folic acid (Fe60<sup>5</sup>); (ii) 30 mg iron plus 400 µg folic acid (Fe30<sup>6</sup>); (iii) and multiple micronutrient supplement (MMN<sup>7</sup>) developed by the United Nations Children’s Fund (UNICEF) with 30 mg iron plus 400 µg folic acid and 13 other micronutrients, including 800 µg RE vitamin A, 200 IU vitamin D, 10 mg vitamin E, 70 mg vitamin C, 1.4 mg vitamin B<sub>1</sub>, 1.4 mg, vitamin B<sub>2</sub>, 18 mg niacin, 1.9 mg vitamin B<sub>6</sub>, 2.6 µg vitamin B<sub>12</sub>, 400 µg folic acid, 30 mg, iron, 15 mg zinc, 2 mg copper, 65 µg selenium and 150 µg iodine. These pills had an identical appearance and delivered to women’s homes in identical bottles on a monthly basis until delivery for daily consumption.

When participants started receiving food supplement packages, they were supposed to be informed about the importance of dietary intake during pregnancy and the health-related

---

<sup>4</sup> cf. MNS (Micronutrient Supplementation)

<sup>5</sup> Used as an acronym for the micronutrient supplementation group given 60 mg iron plus 400 µg folic acid

<sup>6</sup> Used as an acronym for the micronutrient supplementation group given 30 mg iron plus 400 µg folic acid

<sup>7</sup> Used as an acronym for the micronutrient supplementation group given multiple micronutrients

importance of taking the food supplements. CNPs were supposed to deliver messages regarding nutrition daily when they were providing the food packages at the local CNC. There supposed to be radio messages broadcasted at the center. A manual that explained the potential effects and pill-taking instructions of micronutrient supplements was also developed. The actual implementation of these behaviors change communications at locations was not confirmed. According to field observations made by MINIMat investigators, however, education sessions by CNPs were not held in many CNCs or were not provided as guided (by personal communication with Edward Frongillo, Jr., October 6<sup>th</sup>, 2016).

#### ***5.2.4 Data collections***

At the time of enrollment, data were collected on socioeconomic, demographic, and anthropometric features of participants. The number of food supplement packages and pills each participant consumed were monitored through monthly visits of CHW up to 38 weeks of the gestation. Data on dietary intake, maternal morbidity, workload, food security, and the side-effects of MNS<sup>8</sup> and FS were gathered at selected home visits. Information about sociocultural factors anticipated to affect the utilization of the supplements was collected separately at early and late pregnancy. In addition, women were scheduled to visit the sub-center four times during the study period for a full antenatal checkup, which included the confirmation of pregnancy, initiation of micronutrient supplementation (MNS), investigation into past diseases and pregnancy experiences, ultrasonographic assessments, a test of bacterial vaginosis, urine and blood assessments, a survey on violence and stress, and physical examinations, including

---

<sup>8</sup> Used as an acronym for micronutrient supplementation

anthropometry.

### ***5.2.5 Measurements and variable developments***

#### **5.2.5.1 Measurements of consumption of the supplements**

##### **5.2.5.1.1 Food supplements**

At monthly home visits, participants reported the number of packages they consumed during the past 30 days. To validate these self-reported consumption data, responses to a series of the following questions were also examined along with:

- During the last 30 d how often have you eaten the food supplement?
- How often did you eat the food supplement at the feeding center?
- How much of the packet did you, yourself usually eat/finish?
- When you ate the food supplement did you usually eat it between meals or during meals or in small amounts during the day?

##### **5.2.5.1.2 Micronutrient supplements**

The number of pills each participant consumed was checked by CHW during monthly visits. Initially, a bottle that contained 35 pills was distributed to the enrolled women at a clinic visit, then the bottle was replaced at each monthly visit allowing the CHW to record the number of pills remaining in the bottle and, thus, to calculate how many pills each woman had consumed since last monthly visit.

#### **5.2.5.2 Response variables**

Participation behaviors were examined in terms of initiation of the supplementation and persistency in utilizing the supplements throughout the study period. The persistency in utilization was considered with respect to the intensity, duration, and pattern of the consumption

of the food and micronutrient supplements, estimated based on the monthly consumption data. Although the home visits were made from 14 weeks of gestation to 38 weeks of gestation, data only until the visit at 34 weeks of gestation were used to estimate the consumption as there were many women who gave a birth before the visit at 38 weeks. Each home visit was not made at exactly the designated gestational age and the participants' actual gestational ages at each visit showed a wide range of up to more than six months. Therefore, to minimize the time differences, the monthly visits were rearranged according to the actual gestational age of the participants at each monthly visit, which resulted in a range of plus or minus 4 weeks.

#### 5.2.5.2.1 Initiation

In this study, 'initiation' was defined as whether or not a pregnant woman ever started to acquire and consume the food, the micronutrient, or both supplements after she was randomly assigned to each treatment. Women who reported any consumption of the supplements were regarded as those who initiated the supplementations. This includes those who were identified as losses to follow-up but stayed in the study long enough to initiate the supplementations. For FS, those who stayed in the study up to 20 weeks of gestation were included, while for MNS, gestational age of 18 week was used as a cut-off. Consequently, this makes differences in the number of dropouts from the original study, which excluded women who dropped out of the study before giving birth <sup>107</sup> (Figure 5-1)

To investigate combined initiation behaviors of FS and MNS, the participants were classified into four groups (Table 5.1), then into two groups for comparison. In addition, among those who initiated their consumption for at least one type of supplement, the characteristics of early initiators were compared to late initiators.



[Table 5-1] Comparison groups of combined initiation behaviors of food and micronutrient supplementation among MINIMat participants (“+”: Initiated, “-”: Did not initiate)

Initiation	Both	Either		Never
Food Supplement	+	+	-	-
Micronutrient Supplement	+	-	+	-
	<b>Group 1</b>	<b>Group 2</b>		

For combined supplementation (CS<sup>9</sup>), the participants were classified into four groups then compared as shown in the Table 5.2. Early initiators were defined for FS as those women who reported their consumption within one home visits after the enrollment, regardless of their assignments to food intervention groups, ‘early’ vs. ‘usual’. For MNS, they were defined as those who started to take the pills between the distribution and the next home visit.

[Table 5-2] Comparison groups for time until initiation in combined supplementation of food and micronutrient among MINIMat participants

Timing of Initiation	Early	Mixed		Late
Food Supplement	Early	Early	Late	Late
Micronutrient Supplement	Early	Late	Early	Late
	<b>Group 1</b>	<b>Group 2</b>		

#### 5.2.5.2.2 Persistency in utilization

In this study, persistency in utilization indicates the extent to which a woman continues to acquire and consume nutrition supplements throughout her pregnancy, examined in terms of three different features: duration, intensity, and pattern. As for Fs, in particular, other features of utilization, including sharing the supplements with others and replacing home diet with the

---

<sup>9</sup> Used as an acronym for combined supplementation

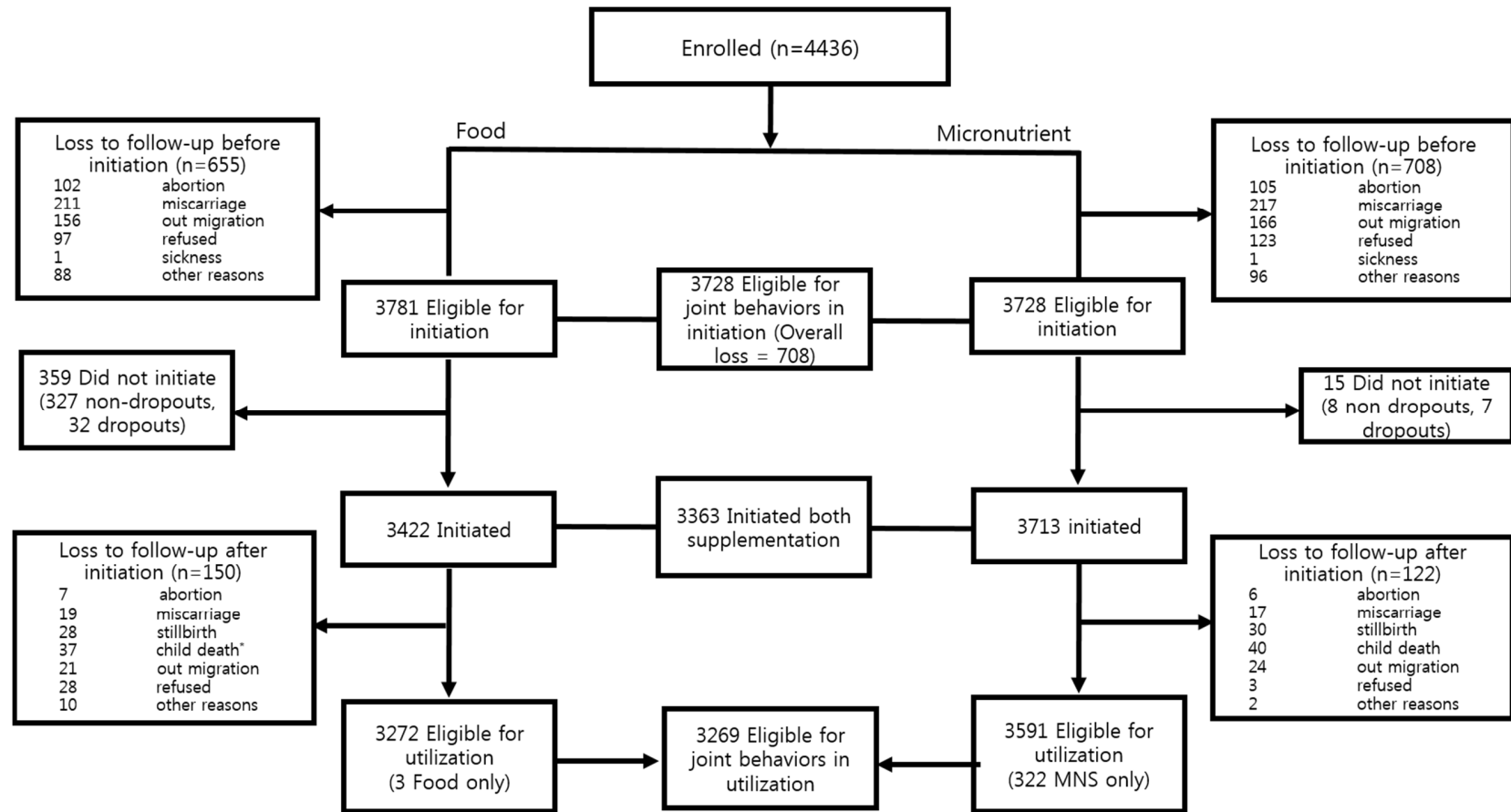
supplements, were also examined because these were unplanned behaviors that could have permitted variations in the amount of the food supplement actually consumed. All participants who stayed in the study until 34 weeks of gestation were included in the persistency analysis, including those who dropped out of the study after week 34. The reasons of losses to follow-up for persistent utilization were abortion, miscarriage, stillbirth, child death, migration, refusal and others (Figure 5-1).

a) Duration

Duration means how long the participants were in the intervention from initiation to discontinuation and reflects the importance of the time period covered by the intervention. Total duration of participation was defined by counting the time periods each women was engaged in each supplementation. Combined behaviors in duration were examined by creating a composite duration variable. Inasmuch as the maximum duration for FS was 6, compared to 5 for MNS, the duration of micronutrient was weighted by multiplying by 1.2, then the sum of the two durations were calculated.

b) Intensity

Intensity, which reflects the level of consumption of the supplements during a given study period, was defined as the mean of intensities of each time period. The intensity of each time period was calculated as follows: for FS, the number of consumed packages was divided by the maximum number of packages consumed for 30 days or 26 packages. Inasmuch as FS was considered to be available from the time of enrollment, when the time between enrollment and the first visit was less than 30 days, the expected number of packages was modified accordingly. For MNS, first, the number of pills taken was obtained by subtracting the number of remaining pills from the total number of pills provided, 35, for each visit. Then the monthly pill counts



\*Child death means babies who were born prematurely then died neonatally

[Figure 5-1] Flow chart of participants

were divided by the number of days since the previous month's visit. For combined intensity, the Z score of each of intensity of FS and MNS was obtained then the sum of these standardized intensities was examined.

It is common to use the percentage of food supplement packages or micronutrient pills each participant actually consumed relative to the assigned amount as a measure for estimating an overall intensity. Instead, the mean of period intensities was used in this study because of missing values in consumption data. Among 3,272 participants eligible for analysis of persistent utilization, 1,720 (52.6%) had missing data for at least one period in their food supplement consumption. In the case of micronutrient, 851 out of 3591 (23.7%) had missing pill counts. Another reason to use the proportion as the indicator of intensity instead of actual counts of the supplements consumed in this study was to account for the differences in the number of assigned packets and pills to each participant, which resulted from the variations in the gestational age at the enrollment and the first clinic visit when the participants could have started to consume the food and micronutrient supplements.

#### c) Pattern

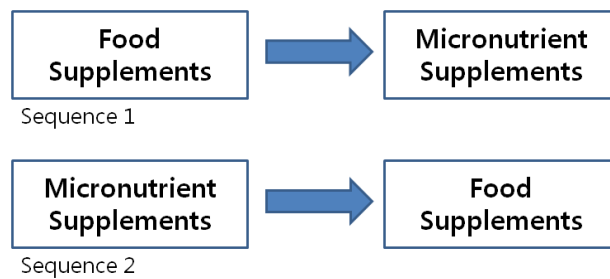
The pattern of persistency, defined as tendency toward consuming the supplements over the intervention period, was determined. This specifies how much supplement was taken by participants at which specific stage of pregnancy and period of the program. Pattern was defined as follows: a woman's consumption data of each supplement were rearranged according to the gestational week of each visit. The intensities were divided into two groups, early and late pregnancy, based on gestational week of 24. Then, by using the average intensity of early and late pregnancy obtained for each supplement (0.6 for food and 0.8 for MNS), each woman was classified into either the high- or low-consumption group within each time frame. The overall

patterns of adherence were determined by examining the combinations of intensity of each time frame within each supplement, for example, “always high,” “always low,” “early high and later low,” and “early low and later high.” Then those in “always high” were compared with others within each supplementation. For combined supplementation, those in “always high” in both types of supplementation were compared with those in other groups (Table 5-3).

[Table 5-3] Comparison groups of patterns of combined supplementation of food and micronutrient among MINIMat participants

Group		Pattern		
Food Supplement	High-high	High-low	Low-high	Low-low
Micronutrient Supplement	High-high	High-low	Low-high	Low-low
	<b>Group 1</b>	<b>Group 2</b>		

In addition, although pregnant women enrolled in the MINIMat were invited to participate in two different types of interventions simultaneously, the sequence of introduction of each supplement might have been different: most women in the ‘early’ FS group had a chance to initiate FS before micronutrient pills were distributed (“sequence 1” in Figure 2) because they were strongly recommended to start consuming the food supplements once they were enrolled. In contrast, the majority of the women in the ‘usual’ FS group might have been provided with micronutrient pills first (“sequence 2” in Figure 2) because the initiation of FS occurred at time of each woman’s preference. Thus participation behaviors of women who started the FS prior to MNS were compared with those of women who received the MNS first. These sequences were defined based on the monthly consumption report of each supplement.



[Figure 5-2] Classification of participation – According to the sequence of initiation of consuming supplements

d) Persistent consumers

Participants with greater overall persistency, who consumed the supplements with consistently greater intensity over a longer period, were compared with those with other levels of duration, intensity and pattern. Persistent consumers were defined as those who had a longer duration, greater intensity, and high-high pattern in each supplementation. The median value was used to classify persistent consumers regarding duration and intensity. Those with high overall persistency in both FS and MNS were defined as persistent consumers of combined supplementation. Factors associated with the overall persistency were examined for food, micronutrient, and combined supplementation.

e) Other behaviors in consumption of FS

a. Sharing.

Whether or not a woman shared food supplements with children, other adults or both was asked at monthly home visits. By aggregating these monthly reports, the degree of sharing of the food supplements was classified into two groups ('never shared' and 'ever shared'). Then the factors affecting sharing behaviors were examined and compared with other participation behaviors.

b. Replacement.

To investigate the status of replacement of home diet with food supplements, women were asked whether or not they consumed the supplements between meals or in place of meals during monthly home visits. Based on these reports, the degree of replacement of home diet with the food supplements was classified into two groups ('never replaced' and 'ever replaced'). Then the factors affecting the degree of replacement, highly replaced versus little replaced, were examined and compared.

5.2.5.3 Explanatory variables (see Appendix 4-1)

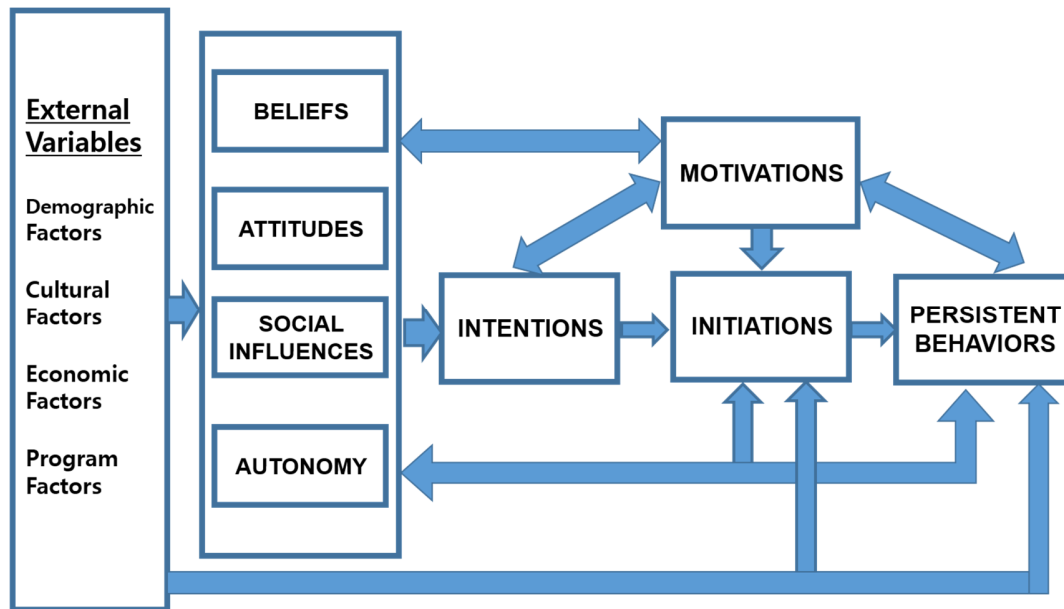
Information of potential explanatory variables was collected through an extensive background questionnaire, questionnaires administered to each home visit, separate sets of questions added to the monthly home visit forms, special questionnaires for compliance, violence, and workload, and questions incorporated in clinic visit forms. Among these, factors associated with the constructs of the model developed in Chapter 4 (Figure 5.3) were selected for analysis.

5.2.5.3.1 External variables

a) Demographic characteristics

**Maternal age at enrollment** was calculated based on the date of birth that each woman reported at enrollment. Even though it is generally difficult to find out the date of birth of women living in rural Bangladesh, only 13 participants in this study had a missing value. Total **education years** was defined by aggregating completed years of study in both formal and informal education and registered and unregistered Madrassah, which was then used as a continuous variable. If necessary, the years were categorized based on the education system of Bangladesh: the first five years as 'primary education', the second five years as 'secondary

education', and more than 10 years as 'higher secondary education' <sup>214</sup>. Data on **parity** collected at enrollment was used as a continuous variable.



[Figure 5-3] The theoretical model developed based on the qualitative study

#### b) Cultural perceptions and practices

In early and late pregnancy, women were asked a series of questions to elucidate cultural perceptions and practices supposed to affect the participation behaviors in the supplementation. These cultural features, abstracted from the results of a formative research on the socio-cultural features in the study area, include delivery-related concerns (**delivery\_concern**) and fears (**delivery\_fear**), perception and concern with the size of the baby (**baby\_size** and **size\_concern**), fear and perception about exposure to evil spirit outside of the house during pregnancy (**fear\_evilspirit**), the perception on the amount of food during pregnancy (**intake\_amount**), feelings about receiving food supplements outside household (**ration\_discomfort**), feelings about going in front of people outside household during pregnancy (**outside\_discomfort**) and



required *burkha* use (**burkha use**) when going outside. For examining the effects of these cultural factors on the initiation of the supplementation, responses only in early pregnancy (at enrollment) were considered, while for the persistency in utilization, information from both early and late gestational age (at week 30) was incorporated.

c) Economic status of household

Economic status of household was assessed with several variables: the area of land the household owned including homestead, land under cultivation and fallow (**land\_area**), ownership of pond/ditch or family land (**possession\_pond/ditch**), the level of possessions of house items (**possession\_hh items**), the number of pairs of shoes the woman possessed used to go outside (**shoes owned**), and the total number clothes each woman owned for both ceremonial and daily use (**clothes owned**). Perceived balance of household income and expenditure (**balanced hh finance**) was another variable considered to reflect the economic status of the household, of which four responses, including surplus, expenditure equaled income, occasional deficit, and constant deficit, were grouped into binary outcomes, 'even or plus' and 'negative' for comparisons. Existence of stable income of the household (**stable income**) was also included. Another variable that reflects the economic status of the household was the status of food insecurity (**food insecurity**). At week 8 and week 30, a total of 11 questions were administered to ask food-related status of the household during the past 30 days then the response of each question was added to create food insecurity variable at week 8 and week 30 respectively. The average of these two variables were calculated and used as a composite variable representing food insecurity of the household.

d) Program-related factors

Intervention groups of food ('early' vs. 'usual') and micronutrient (Fe30, Fe60, and

MMN) were regarded as program-related factors. Gestational ages at enrollment (**GA at enrollment**) and each home visit were calculated based on the date of last menstruation each participant reported at enrollment. Although those who were enrolled at the gestational age greater than 14 weeks were supposed to be excluded from MINIMat, 43 out of 4436 (0.97%) women showed their gestational age at enrollment greater than 14, a range of 15 to 28 and stayed in the study. Factors associated with program delivery were also included; provision of information why the participants should take the pills (**MNS information**) that was checked at week 18; availability of the pills monitored at week 18 and 30 (**MNS availability**); acceptability of the pills and the food packages, a composite binary variable of a series of questions regarding taste and smell of the supplements asked at week 18 and 30 (**FS acceptability** and **MNS acceptability**); and side-effects of the supplementation, a binary variable indicating that a woman ever experienced any side-effects after taking the supplements (**FS side-effects** and **MNS side-effects**) identified by a series of questions at 18 and 30 weeks for micronutrient pills and only at 30 week for food packages. As for FS, additional questions, including distance to the CNC (**distance to CNC**), timing of the distribution of the food packages (**distribution time**), and waiting time at CNC (**waiting time at CNC**), were asked at week 30. Finally, the level of involvement of community nutrition promoters (CNP) in the participants' supplement consumption (**influence of CNP**) was considered. Inasmuch as most of these data were collected at mid-pregnancy of participants (18 and 30 week of gestation), program factors were incorporated only in utilization analysis.

#### 5.2.5.3.2 Psychosocial variables

##### a) Beliefs

Factors associated with susceptibility to physical illnesses or undesirable delivery

outcomes were considered. Monthly collected data on morbidities (**sicknesses**), **health problems**, and subjective feeling of weakness (**physical weakness**) were aggregated to create continuous variables indicating how many times or episodes the participant experienced such conditions. For initiation analysis, information only up to 14 week's visit was combined to create separate variables. Pre-pregnancy weight (**pre-pregnancy weight**), previous pregnancy experiences (**previous preg experiences**), focused on abnormal birth outcomes, and previous disease status (**previous dx experiences**), all of which were collected at baseline and during clinic visits, were also examined.

b) Attitudes

Awareness and perceptions about micronutrient pills, perceived effects of the food and micronutrient supplements, weight gain and changes in hemoglobin concentration are considered in relation to attitudes. Awareness of both positive and negative effects (**MNS positive perceptions** and **MNS negative perceptions**) of iron tablets was asked at home visit of week 8. Perceptions on the importance of taking iron tablets when sick or healthy (**pill importance, ill and pill importance, healthy**) then the responses were used to create a binary variables for each question at each visit. The number of days needed until a person could realize whether or not the iron tablet had an effect (**days to affect**) were surveyed at week 8 and 30's home visit and the average of the two measurements was used as a continuous variable. Perceived effects of the food supplements were monitored in terms of changes in strength or energy (**FS effects, strength**), health (**FS effects, health**), and weight (**FS effects, weight**) at week 30 while changes in appetite (**MNS effects, appetite**) and/or strength (**MNS effects, strength**) and experience of positive effects (**MNS effects, positive**) after taking pills were checked at week 18 and 30 for micronutrient supplements. Each of the perceived effects was examined as a binary variable then

was aggregated to create a variable representing the overall effect through a principal component analysis. **Weight gains** were monitored by comparing the pre-pregnancy weight and weight measured at clinic visit at 14, 19, and 30 week. Changes in hemoglobin concentrations (**increase\_Hb conc.**) were followed by the comparison between the concentration at week 14 and subsequent measurements at 19 and 30 week. With regard to initiation analysis, information collected during only early pregnancy was used, which includes awareness and perceptions about taking micronutrient supplements, the number of days until the effects of micronutrient supplements appear, and weight gain up to week 14.

c) Social influences

Family-related features, apart from economic status of household, were regarded as factors representing social influences. Family composition, which indicates whether or not a woman was living with her husband's family members in the same household or *bari* (**living with in-laws**) and whether or not her mother-in-law, in particular, was living together, were considered. Experience of domestic violence was examined as binary variables in terms of 4 different types, including **controlling behaviors**, **emotional violence**, **physical violence**, and **sexual violence** both in life time and during pregnancy, respectively (**\_life or \_preg**). A variable that indicated whether or not participants ever performed heavy work (**workload**) was included, which was created based on responses to a list of heavy work tasks. Whether or not a woman was able to secure enough time to relax in the previous day (**rest**) was asked at week 30 then included in the analysis as a binary variable, indicating whether the rest was enough or not. Participants were asked a series of questions about the direct influence of family members on their nutrition supplement consumption. The involvement of each family member (such as husband, mother or mother-in-law, father or father-in-law, and sister-in-law) was considered as separate variables

(**influence of husband, influence of mother-in-law, influence of father-in-law, and influence of sister-in-law**, respectively) in addition to the influence of neighbors or friends on supplement consumption (**influence of others**).

#### d) Women's Autonomy

Generally, women's autonomy has been examined based on a series of components expected to reflect the degree of autonomy because autonomy cannot be measured directly<sup>38,44,48,71,84,146,202</sup>. Among these components, three dimensions, mainly selected to explain women's autonomy in South Asian region in previous studies<sup>38,48,84,129,133,134,146,175</sup>, were examined: freedom in movement, control over finances, and decision-making power. Freedom in movement was assessed based on a series of questions asking about places a woman was able to visit (**mobility**) and whether or not she needed to obtain permission to visit a place (**permission**). The degree of control over finances was measured by directly asking the participants various sources of money they could handle (**control over finance**). In addition, whether or not the women had earned income (**earned income**) and how much the women had authority to spend household money (**purchase**), created by counting items or categories they purchased or spent on, were also examined as components to reflect control over finance. As for **decision-making** power, the women answered how much their husbands, mothers-in-law, fathers-in-law, sisters-in-law neighbors, or themselves influenced on making decision of taking the supplements. Finally, having a membership in organized groups, particularly NGOs (**NGO membership**), was examined because this membership has been associated with women's empowerment and autonomy in rural area of Bangladesh<sup>215,216</sup>

#### 5.2.5.3.3 Seasonality

In Bangladesh, food availability is closely associated with seasonal variations in crop

harvest <sup>217,218</sup>, which subsequently can affect participation behaviors in nutrition supplementation. To consider these seasonal effects on the initiation and persistency in utilizing the supplements, **season at enrollment** was included as a binary variable: lean period when the food availability is the lowest, July to October <sup>217</sup>, versus non-lean period <sup>218-220</sup>.

### ***5.2.6 Statistical Analysis***

Descriptive analysis was carried out for baseline characteristics and participation behaviors of participants. Comparisons of baseline characteristics between women who dropped out of the study and women who stayed in the study for initiation and persistent utilization were made by using student's t-tests for continuous variables and bivariate logistic regressions for categorical variables.

The relationships between initiation behaviors and potential explanatory factors were examined initially through bivariate logistic regressions then adjusted logistic regressions by controlling for potential confounding variables, including gestational age at enrollment and seasonality.

The associations of predictive factors with durations and intensities were examined through bivariate and multiple regressions adjusted for gestational age at enrollment and season at enrollment. The associations between potential factors and other outcome variables, including pattern, overall persistency, sharing, and replacement were examined through bivariate and multiple logistic regressions adjusted for gestational age and season at enrollment. The comparisons of factors of significant influences across different persistency behaviors were based on the results of these adjusted regressions. To account for numerous statistical tests and a large sample size, which potentially led to conclusions that regard negligible effects as

statistically significant, variables with relatively lower probability of Type I error were mainly considered for comparisons. The corrected significance level was determined based on the Holm-Bonferroni correction<sup>221</sup>. The extensive results of crude and adjusted analysis were included in the appendices.

Based on the results from these adjusted analyses, variables considered to be influential ( $p < 0.05$ ) were selected from each dimension to set up a model that explains each of the participation behaviors. To account for missing values, for binary outcome variables, such as initiation, pattern and persistent consumers, multiple imputations ('proc mi') that created 10 imputed datasets by employing a Markov chain Monte Carlo (MCMC) method and the expectation-maximization (EM) algorithm were conducted, then parameters of explanatory variables were estimated subsequently through 'proc mianalyze' in SAS (see Appendix 4-8). For participation behaviors estimated in a continuous variable, parameter estimation was conducted by using full information maximum likelihood (FIML), which uses 'proc calis' command in SAS.

To select the appropriate model to explain participation behaviors, the following criteria were considered: goodness of fit of each model estimated by Akaike information criterion (AIC) or pseudo R-square (used for logistic regressions), the magnitude of parameter estimate and significance of each variable in each model selected (see Appendix 4-9). All analyses were conducted with SAS 9.4 TS Level 1M2 X64\_7Pro platform.

### **5.3 Results**

Among the 4,436 enrolled women, 655 and 708 had dropped out of the study before they initiated FS and MNS respectively (Figure 1). For the initiation of FS, 53 more participants were

eligible than for the initiation of MNS because some women dropped out after they initiated consumption of Fs but before they received the micronutrient pills. For the utilization analysis, 3,272 women were eligible for FS and 3,591 for MNS. Those who initiated FS and MNS and hence were eligible for analysis of utilization of CS were 3,269 (Figure 1).

### ***5.3.1 Baseline characteristics of participants***

At enrollment, participants were, on average, 26 (range 14 to 50) years old. Approximately 10 % of them were aged 30 years and above. One-third of the participants never had had a baby and more than 20% had 3 or more children. Among those who were less than 20 years old, more than 90% were experiencing their first pregnancy (Table 5-4).



[Table 5-4] Baseline characteristics of participants

Characteristics	N	Frequency	%
Maternal age at enrollment (years)	4,422		
< 20		712	16.1
20 ≤ and < 25		1,313	29.69
25 ≤ and < 30		1,211	27.39
30 ≤ and < 35		772	17.46
35 ≤		414	9.36
Parity	4,421		
0		1,500	33.93
1		1,252	28.32
≥ 2		1,669	37.75
Marital status	4,436		
Married		4,433	99.93
Separated		2	0.05
Deserted		1	0.02
Education	4,436		
None		1,371	30.91
Primary		935	21.08
High school (6-10)		1,871	42.17
Higher secondary and more		259	5.84
Existence of stable household income	4,436		
Yes		2,430	54.78
No		2,006	45.22
Status of household income and expenditure	4,423		
Income ≥ Expenditure		3,570	80.71
Income < Expenditure		853	19.29
Pre-pregnancy BMI	3,775		
< 18.5 kg/m <sup>2</sup>		1,003	26.57
≥ 18.5 kg/m <sup>2</sup>		2,772	73.43
GA at enrollment	4,436		
< 8		1,132	25.52
8 ≤ and ≤ 14		3,261	73.51
> 14		43	0.97

### **5.3.2 Initiation**

#### **5.3.2.1 Characteristics of non-dropouts versus dropouts**

In general, baseline characteristics of those who dropped out of the study before initiating supplementation were not significantly different from those who stayed in it (Table 5-5). Only the differences in gestational age at enrollment were statistically significant but the actual mean differences were less than a week.

#### **5.3.2.2 Initiation of food and micronutrient supplementation**

Among the 3,781 women who stayed in the study long enough to initiate FS, 3,422 (90.5%) started to consume food supplements, while 3,713 (99.6%) initiated MNS leaving only 15 participants who did not initiate MNS (Table 5-6). In terms of FS intervention group, a significantly ( $p < 0.0001$ ) lower proportion of the women in the usual food supplementation group initiated FS than women in early group did.

The majority of the participants initiated both forms of supplementation. Of the six women who initiated only FS, five were in the early supplementation group. All nine of the women who did not initiate both types of supplementation were enrolled when the season was not a lean period and their households tended not to experience deficit in financial resources. Eight of these nine women had a relatively low parity (either 0 or 1). In addition, a half of these participants did not have any other information except data collected at enrollment, which implies that their failure to consume any supplement possibly resulted from failure of follow-up at the program level.

[Table 5-5] Comparison of baseline characteristics between dropouts and non-dropouts for initiation of food, micronutrient, and combined supplementation among MINIMat participants

Factors	FS			MNS		
	Dropout	Non-Dropout	p-value	Dropout	Non-Dropout	p-value
Maternal age	654, 25.8 ± 6.44*	3777, 25.8 ± 5.90	0.9894 <sup>†</sup>	698, 25.8 ± 6.57	3724, 25.8 ± 5.89	0.8072
Parity	646, 1.4 ± 1.52	3775, 1.3 ± 1.37	0.6311	699, 1.4 ± 1.54	3722, 1.3 ± 1.36	0.2569
Years of education	655, 5.1 ± 4.21	3781, 5.2 ± 5.07	0.5745	708, 5.0 ± 4.20	3728, 5.2 ± 4.12	0.3259
Pre-pregnancy BMI	528, 20.3 ± 2.69	3247, 20.1 ± 2.49	0.0825	574, 20.3 ± 2.66	3201, 20.1 ± 2.50	0.064
GA at enrollment	655, 8.7 ± 2.15	3781, 9.1 ± 2.20	<0.0001	708, 8.8 ± 2.13	3728, 9.1 ± 2.21	0.0002
Existence of stable income						
Yes	316 (15.75)**	1690 (84.25)	0.0924 <sup>††</sup>	336 (16.75)	1670 (83.25)	0.1922
No	339 (13.95)	2091 (86.05)		372 (15.31)	2058 (84.69)	
Status of household income and expenditure						
Income ≥ Expenditure	522 (14.62)	3048 (85.38)	0.6471	563 (15.77)	3007 (84.23)	0.5297
Income < Expenditure	130 (15.24)	723 (84.76)		142 (16.65)	711 (83.35)	
Food supplementation group						
Usual	350 (15.77)	1869 (84.23)	0.0587	356 (16.04)	1863 (83.96)	0.8801
Early	305 (13.76)	1912 (86.24)		352 (15.88)	1865 (84.12)	
Micronutrient supplementation group						
Fe30	217 (14.66)	1263 (85.34)	0.9344	234 (15.81)	1246 (84.19)	0.8297
Fe60	197 (13.35)	1279 (86.65)	0.0623	213 (14.43)	1263 (85.57)	0.0517
MMN	241 (16.28)	1239 (83.72)		261 (17.64)	1219 (82.36)	

\* Total number, mean ± SD

\*\* Number (%)

<sup>†</sup> p-value obtained from two sample t-test

<sup>††</sup> p-value obtained from simple logistic regression

[Table 5-6] Initiation status of MINIMat participants according to supplementation groups

Type of supplementation (n)	Initiated	Did not initiated	p-value
Food (3,781)	3,422 (90.51) *	359 (9.49)	<0.0001**
Early	1,824 (95.40)	88 (4.60)	
Usual	1,598 (85.50)	271 (14.50)	
Micronutrient (3,728)	3,713 (99.60)	15 (0.4)	0.8294
Fe30	1,242 (99.68)	4 (0.32)	
Fe60	1,257 (99.52)	6 (0.48)	
MMN	1,214 (99.59)	5 (0.41)	
Combination of food and micronutrient initiation (3,728)			
Initiated both	3,363 (90.21)		
Initiated only food	6 (0.16)		
Initiated only micronutrient	350 (9.39)		
Initiated neither	9 (0.24)		

\*N (%)

\*\* Results of Chi-square test of initiation among groups

### 5.3.2.3 Factors affecting initiation of food and combined supplementation

Factors associated with each dimension in the theoretical model (Figure 5-3) were compared between non-initiators and initiators and factors that showed statistically significant influences in the adjusted analyses were summarized in Table 5-7 (see Appendix 4-2). Generally, the associations of factors with initiation of the FS were similar to those examined in combined initiation behaviors in terms of their magnitude, direction, and statistical significances. Factors associated with initiation of MNS were not examined because so few women (n=15) did not start the supplementation.

[Table 5-7] Factors affecting initiation of FS and combined supplementation among MINIMat participants

FS		CS	
Positive	Negative	Positive	Negative
<b>Maternal age</b>	<b>Years of education</b>	<b>Maternal age</b>	<b>Years of education</b>
<b>Parity</b>	<b>Delivery_concern</b>	<b>Parity</b>	<b>Delivery_concern</b>
<b>Early FS group</b>	<b>Ration_discomfort</b>	<b>Early FS group</b>	<b>Ration_discomfort</b>
<b>Living with in-laws</b>	<b>Burkha use</b>	<b>Living with in-laws</b>	<b>Burkha use</b>
<b>NGO membership</b>	<b>Land area</b>	<b>NGO membership</b>	<b>Land area</b>
<b>Control over finance</b>	<b>Shoes or clothes owned</b>	<b>Control over finance</b>	<b>Shoes or clothes owned</b>
	<b>Possession_hh items</b>		<b>Possession_hh items</b>

#### 5.3.2.3.1 External variables (Demographic, cultural and economic factors)

##### a) Demographic characteristics

Maternal age, parity, and education significantly related to initiation of FS (Table 5-7). As maternal age and parity increased, women tended to initiate consumption of the food supplements, but as the total years of education increased, women were less likely to initiate FS. These same results held when considering both FS and MNS together; those who initiated both kinds of supplementation tended to be older at enrollment, of higher parity, and less educated.

##### b) Cultural perceptions and practices

Compared to those who did not initiate FS, participants who initiated generally showed less culture-related perceptions and practices that led them to be fearful and worried about their deliveries or leaving their houses (Table 5-8). Likewise, women who initiated both forms of supplementation had fewer culture-bound perceptions and practices.

This tendency was confirmed in the results of further analyses (Table 5-7). Women who thought about the delivery frequently were less likely to initiate their consumption of food

supplements than those who did not do so. As women's discomfort about receiving the food ration outside the household or requirement to use a *burkha* increased, approximately 30% fewer women initiated FS compared with women who had less discomfort or requirement.

The same results were also found in the analyses of combined initiation behaviors. Those who initiated both kinds of supplementation were less likely to be concerned about the delivery, feel uncomfortable for receiving food rations, and wear a *burkha* obligatorily.

c) Economic status of household

Most of the variables that reflected economic status of household were significantly ( $p < 0.05$ ) negatively associated with initiation of FS (see Appendix 4-2). As a household owned more land or a woman had more clothes or shoes, women were significantly ( $p < 0.001$ ) less likely initiate FS than those who were worse off (Table 5-7). These results held for those who initiated both kinds of supplementation as well.

[Table 5-8] Frequency of cultural features according to initiation status of food, micronutrient, and combined supplementation among MINIMat participants

Cultural features	FS		MNS		CS	
	Initiated	Not initiated	Initiated	Not initiated	Initiated both	Others
<b>Frequency of thinking about the delivery</b>						
Never	255 (11.12)*	10 (3.92)	260 (10.38)	2 (20.00)	250 (11.09)	12 (4.60)
Monthly	84 (3.66)	7 (2.75)	89 (3.55)	1 (10.00)	82 (3.64)	8 (3.07)
Weekly	421 (18.35)	39 (15.29)	452 (18.04)	3 (30.00)	416 (18.45)	39 (14.94)
Daily	898 (39.15)	106 (41.57)	987 (39.39)	3 (30.00)	882 (39.11)	108 (41.38)
Several times per day	636 (27.72)	93 (36.47)	718 (28.65)	1 (10.00)	625 (27.72)	94 (36.02)
<b>Feeling about the delivery</b>						
Not fearful	414 (18.07)	30 (11.76)	432 (17.26)	5 (50.00)	403 (17.9)	34 (13.03)
Fearful	1,073 (46.84)	98 (38.43)	1,156 (46.18)	2 (20.00)	1,058 (46.98)	100 (38.31)
Very fearful	804 (35.09)	127 (49.80)	915 (36.56)	3 (30.00)	791 (35.12)	127 (48.66)
<b>Preferable size of the baby to deliver</b>						
Big	185 (8.08)	21 (8.24)	205 (8.19)	0	184 (8.17)	21 (8.05)
Medium	1,630 (71.15)	188 (73.73)	1788 (71.43)	4 (40.00)	1,602 (71.14)	190 (72.80)
Small	476 (20.78)	46 (18.04)	510 (20.38)	6 (60.00)	466 (20.69)	50 (19.16)
<b>Concern about the size of the baby</b>						
Not concerned	1,388 (60.53)	146 (57.25)	1,506 (60.12)	7 (70.00)	1,363 (60.47)	150 (57.47)
Concerned	376 (16.4)	35 (13.73)	405 (16.17)	2 (20.00)	371 (16.46)	36 (13.79)
Very concerned	529 (23.07)	74 (29.02)	594 (23.71)	1 (10.00)	520 (23.07)	75 (28.74)

\* Numbers (%). All percentages are representing column percent

[Table 5-8] Frequency of cultural features according to initiation status of food, micronutrient, and combined supplementation among MINIMat participants (cont'd)

Cultural features	FS		MNS		CS	
	Initiated	Not initiated	Initiated	Not initiated	Initiated both	Others
<b>During the first three months or pregnancy, it is better to eat</b>						
Less than usual	233 (10.17) *	21 (8.24)	246 (9.82)	5 (50.00)	226 (10.03)	25 (9.58)
The same	526 (22.95)	55 (21.57)	571 (22.80)	1 (10.00)	517 (22.95)	55 (21.07)
More than usual	1,533 (66.88)	179 (70.20)	1,687 (67.37)	4 (40.00)	1,510 (67.02)	181 (69.35)
<b>Feeling about receiving food rations outside the household</b>						
Very comfortable	280 (12.22)	21 (8.24)	296 (11.83)	0	275 (12.21)	21 (8.05)
Comfortable	1,175 (51.29)	115 (45.10)	1,269 (50.70)	6 (60.00)	1,157 (51.38)	118 (45.21)
Not comfortable	836 (36.49)	119 (46.67)	938 (37.48)	4 (40.00)	820 (36.41)	122 (46.74)
<b>Feeling about going in front of people outside household during pregnancy</b>						
Very comfortable	53 (2.31)	6 (2.35)	58 (2.32)	0	52 (2.31)	6 (2.30)
Comfortable	956 (41.71)	106 (41.57)	1,045 (41.73)	5 (50.00)	941 (41.77)	109 (41.76)
Not comfortable	1,283 (55.98)	143 (56.08)	1,401 (55.95)	5 (50.00)	1,260 (55.93)	146 (55.94)
<b>Burkha use is required</b>						
No	2,057 (60.11)	180 (50.14)	2,196 (59.14)	9 (60.00)	2,020 (60.07)	185 (50.68)
Yes	1,365 (39.89)	179 (49.86)	1,517 (40.86)	6 (40.00)	1,343 (39.93)	180 (49.32)

\* Numbers (%). All percentages are representing column percent



#### 5.3.2.3.2 Psychosocial factors

In general, variables associated with women's own beliefs in the susceptibility to diseases and attitudes toward supplements were not statistically associated with the initiation of FS. Among variables related to social influences, women who lived with their husband's family members were significantly more likely to initiate food and combined supplementation. Women who were members of organized groups, including micro-credit programs or other NGOs, were more likely to initiate the supplementation than those who were not. Among variables associated with women's autonomy, women who had more control over household finance were significantly more likely to start consumption of the food supplements than those with less control, while other autonomy-related variables were not significantly associated with this outcome.

#### 5.3.2.4 Factors affecting initiation of micronutrient supplementation

Among the 15 women who did not initiate MNS, all but one participant was enrolled in the non-lean season, 11 out of 15 were from 'early' FS group, and 12 women had one child or no children. Only two of them experienced a deficit household income but variables representing household economic status were not different from those of initiators (data not shown).

The variables with significant differences between initiators and non-initiators were autonomy-related factors. Those who did not initiate MNS tended to have less decision power ( $p=0.0041$ ), less control over finance ( $p=0.029$ ), and less mobility ( $p=0.0053$ ) than women who started to consume the supplements.

#### 5.3.2.5 Model selection for initiation behaviors

Variables that were considered in the development of a model to explain initiation of FS

and CS were presented in Table 5-9.

[Table 5-9] Factors considered in the development of a model to explain initiation of FS and CS among MINIMat participants

Demographic characteristics	Cultural perceptions and practices	Economic status of the household	Program features
Maternal age	Delivery_fear	Land area	'Early' FS group
Parity	Delivery_concern	Possession_hh items	
Years of education	Evil_spirit	Shoes or clothes owned	
	Burkha use	Stable_income	
	Ration_discomfort		
	Outside_discomfort		
Beliefs	Attitudes	Social influences	Autonomy
Pre-pregnancy weight	Number of days to affect	Family composition_living with in-laws	Control over finance
			NGO participation

Inasmuch as maternal age and parity were highly correlated, each of them was considered separately. Similarly, variables of economic status were substituted for one another then the AIC values of each model were compared and the one with the lowest AIC value was selected.

The final model included nine variables, including one of the controlling variables, season at enrollment (Table 5-10). The Max-rescaled  $R^2$  of this model was 0.1289 and AIC was 2157.03, compared to 2375.225 of the AIC of the intercept-only model. Generally, models with total years of education showed greater R-squared and lower AIC values than those of maternal age or parity among demographic characteristics. Delivery concerns and discomfort in receiving food rations were consistently highly significant throughout multivariable analysis. Among variables reflecting economic status of a household, the area of land owned was included to avoid multicollinearity caused by high correlation between total years of education and other economic factors. The FS intervention groups was a strong factor, which alone explained about

6% of variability in FS initiation (data not shown). None the belief or attitude-associated variables was selected, whereas living with in-laws and control over finance were both significant positive factors in FS initiation in this model selection. With respect to the model that explained initiation behaviors of CS, initiation of both types of supplementation vs. others, the variables in the final model were similar to those in the model for initiation of FS, living with in-laws and season at enrollment were no longer included.

[Table 5-10] Selected factors explaining initiation behaviors of MINIMat participants in relation to food and combined supplementation, considering both external and psychosocial variables, analyzed based on 10 imputed datasets created by using MCMC method and EM algorithm<sup>†</sup>

Factors	FS (n=3,781)		CS (n=3,728)	
Years of education	0.934 (0.907, 0.962) *	<0.0001 **	0.927 (0.901, 0.955)	<0.0001
Delivery concerns	0.525 (0.403, 0.685)	0.0008	0.558 (0.392, 0.796)	0.0019
Ration_discomfort	0.637 (0.483, 0.841)	0.0016	0.634 (0.475, 0.845)	0.0024
Land_area	0.999 (0.998, 1.000)	0.0242	0.999 (0.998, 0.999)	0.0394
‘Early’ FS group	0.278 (0.215, 0.358)	<0.0001	0.294 (0.229, 0.379)	<0.0001
Living with in-laws	1.620 (1.222, 2.148)	0.0010		
Control over finance	1.356 (1.208, 1.522)	0.0005	1.293 (1.100, 1.520)	0.0026
Season at enrollment	0.730 (0.557, 0.957)	0.0235		

<sup>†</sup> Max-rescaled R<sup>2</sup> for FS is 0.129 and for CS is 0.115

\* Odds ratio (95% CI)

\*\* p-value

In summary, according to this model, participants who initiated FS or both FS and MNS were less educated, were less concerned about delivery, were less-bounded by feeling uncomfortable in receiving food rations, owned less land, had greater control over household finance, and were more likely to be ‘early’ group in FS than those who did not initiate these supplements. In addition, living with in-laws and enrollment at lean season were associated with FS initiation.

### 5.3.2.6 Factors affecting the timing of initiation in food, micronutrient, and combined supplementation

Participants were classified according to the time when they started to consume the supplements to identify earlier initiators (Table 5-11). For FS, earlier initiators, regardless of their assignments to one of two food intervention groups, were those who began consumption of the supplements before the first home visit was made (41.6% of women). For MNS, earlier initiators were those who started taking their pills between the initial distribution of the pills and the first follow-up visit (91%). Among those who initiated both forms of supplementation, 33.5% were earlier initiators.

[Table 5-11] Comparison of frequencies of earlier and later initiators of food, micronutrient, and combined supplementation among MINIMat participants

Time of initiation	FS	MNS	Combined
Earlier	1,424 (41.61) *	3,379 (91.00)	1,263 (33.48)
Later	1,998 (58.39)	334 (9.00)	2,100 (62.44)
Total	3,422	3,713	3,363

\* N (%)

Factors associated with earlier initiation were also examined and those were statistically significant are presented (Table 5-12). Maternal age and parity were positively associated with earlier initiation of food, micronutrient, and combined supplementation. Being in the ‘early’ FS group, and earning monetary income were positively associated with earlier initiation of food and combined supplementation, whereas feeling uncomfortable about going outside of the household and possessing many household items were negatively associated with FS and CS. Particularly, among those initiated FS earlier, 90.87% of the women belonged to ‘early’ FS group, while 9.13% were from ‘usual’ FS group. This showed that the time of initiation was self-selected and approximately 10% of women in ‘usual’ group also started to consume the

[Table 5-12] Factors significantly associated with early initiation of food, micronutrient, and combined supplementation among MINIMat participants

Factors*	FS		MNS		CS	
Maternal age	1.014 (1.002, 1.025)	0.0232**	1.070 (1.048, 1.093)	<0.0001	1.020 (1.007, 1.032)	0.0015
Parity	1.062 (1.011, 1.116)	0.0160	1.300 (1.177, 1.437)	<0.0001	1.082 (1.029, 1.138)	0.0022
Discomfort_ration	-	-	0.621 (0.477, 0.809)	0.0004	-	-
Discomfort_outside	0.824 (0.697, 0.974)	0.0234	-	-	0.809 (0.682, 0.960)	0.0153
Possession_pond/ditch	-	-	0.646 (0.478, 0.873)	0.0044	-	-
Possession_hh items	0.958 (0.931, 0.987)	0.0044	-	-	0.957 (0.929, 0.986)	0.0041
Early FS group	29.09 (23.60, 35.86)	<0.0001	-	-	24.90 (20.06, 30.92)	0.0001
Sickness	0.453 (0.218, 0.939)	0.0332	-	-	-	-
Previous dx experiences	1.291 (1.021, 1.634)	0.0332	-	-	-	-
MNS_positive perceptions	-	-	1.532 (1.115, 2.104)	0.0085	1.282 (1.011, 1.626)	0.0401
Days to affect	-	-	1.018 (1.004, 1.031)	0.0094	-	-
Earned income	1.362 (1.064, 1.743)	0.0143	-	-	1.416 (1.103, 1.818)	0.0064
Purchase	-	-	1.126 (1.057, 1.199)	0.0002	-	-
Control over finance	-	-	1.384 (1.203, 1.592)	<0.0001	-	-
Mobility	-	-	1.114 (1.009, 1.229)	0.0319	-	-
Self decision-making	-	-	1.101 (1.034, 1.172)	0.0028	-	-

\*All factors were adjusted for gestational age at enrollment and season at enrollment

\*\* OR (95% CI), p-value

supplement early even though the proportion of early initiator was far lower than that of ‘early’ FS group.

Factors relevant to MNS, such as positive perceptions and greater number of days until experiencing the effects of iron tablets, were positively associated with early initiation of MNS. Among the factors related to MNS, positive perceptions about taking iron tablets was also positively related to early initiation of CS. Most of autonomy-associated factors were also positively with earlier initiation of MNS, whereas ownership of pond, ditch or family land was a negative predictor of earlier initiation of MNS.

### ***5.3.3 Utilization of nutrition supplements***

#### **5.3.3.1 Characteristics of non-dropouts versus dropouts**

Compared with participants who dropped out of the study before initiation, women who stopped participation after initiation had more cases of stillbirth and child death as they entered the second and third trimesters. Another feature to note was that women refused to continue FS more than MNS after they started to consume both types of supplements (Figure 5-1).

The baseline characteristics of those who dropped out of the study after initiation generally were not different from participants who stayed in the study until 34 weeks of gestation (Table 5-13). Only gestational age at enrollment and FS intervention group differed between the drop-outs and those who remained in the study. Those who enrolled later in their gestational ages were more likely to stop participating in FS and MNS than those who enrolled earlier, which is opposite to the trend in initiation. Women in the ‘early’ FS group had a significantly higher dropout rate than those in the ‘usual’ group

[Table 5-13] Comparison of baseline characteristics between dropouts and non-dropouts for utilization

	FS			MNS		
	Dropout	Non-Dropout	p-value	Dropout	Non-Dropout	p-value
<b>Maternal age</b>	26.5 (6.51), 148*	25.9 (5.88), 3271	0.2111 <sup>†</sup>	25.9 (6.21), 119	25.8 (5.88), 3590	0.8431
<b>Parity</b>	1.5 (1.52), 148	1.4 (1.38), 3269	0.1992	1.2 (1.32), 119	1.3 (1.36), 3588	0.2729
<b>Years of education</b>	5.1 (4.64), 150	5.0 (4.06), 3272	0.5745	5.8 (4.65), 122	5.2 (4.10), 3591	0.1354
<b>Pre-pregnancy BMI</b>	20.3 (2.49), 123	20.1 (2.47), 2847	0.3000	20.4 (2.64), 91	20.1 (2.49), 3101	0.2740
<b>GA at enrollment</b>	9.4 (2.07), 150	9.1 (2.17), 3272	0.0474	9.7 (2.27), 122	9.1 (2.20), 3591	0.0016
<b>Existence of stable income</b>						
Yes	61 (4.06)**	1443 (95.94)	0.4076 <sup>†</sup>	59 (3.55)	1604 (96.45)	0.4202
No	89 (4.64)	1829 (95.36)		63 (3.07)	1987 (96.93)	
<b>Status of household income and expenditure</b>						
Income ≥ Expenditure	119 (4.33)	2629 (95.67)	0.7142	103 (3.44)	2891 (96.56)	0.3093
Income < Expenditure	31 (4.65)	635 (95.35)		19 (2.68)	690 (97.32)	
<b>Food supplementation group</b>						
Usual	49 (3.07)	1549 (96.93)	0.0005***	68 (3.66)	1791 (96.34)	0.2037
Early	101 (5.54)	1723 (94.46)		54 (2.91)	1800 (97.09)	
<b>Micronutrient supplementation group</b>						
Fe30	51 (4.42)	1103 (95.58)	0.9305	42 (3.38)	1200 (96.62)	0.7859
Fe60	53 (4.62)	1095 (95.38)	0.6309	45 (3.58)	1212 (96.42)	0.4590
MMN	46 (4.11)	1074 (95.89)		35 (2.88)	1179 (97.12)	

\* Mean ± SD, total number of subjects

\*\* Number (%)

\*\*\* OR (95% CI) is 0.540 (0.381, 0.764)

<sup>†</sup> p-value obtained from two sample t-test

<sup>††</sup> p-value obtained from simple logistic regression

### 5.3.3.2 Persistency in utilizing food and micronutrient supplements

Behaviors that reflected persistency in utilizing both types of supplements are presented in Table 5-14. The mean food supplement consumption was 69 packages over 4.6 out of a maximum of 6 periods of monthly visits. The average intensity was 0.54, which means that the participants consumed approximately a half of the assigned food packages. Micronutrient supplement consumption was 105 pills on average. The mean duration of MNS participation was 4.7 out of a maximum of 5 periods and the mean intensity was 0.80, much higher than that of FS. Among FS intervention groups, the ‘early’ group had significantly higher values in all utilization behavior variables than the ‘usual’ group. Specifically, the mean food supplement consumption was 20 packages higher, the mean duration was 1.2 time periods longer, and the mean intensity was 0.13 greater in the ‘early’ compared to the ‘usual’ group. In contrast, there were no differences among MNS intervention groups in the number of pills consumed, duration participated, and intensity.

[Table 5-14] Utilization of nutrition supplement – total consumption, duration, and intensity by intervention groups of MINIMat

Type of supplementation (n)	Number of food packages or MNS pills	Duration (number of time periods)	Intensity*
<b>Food (3,272)</b>			
Early (1,723) **	78.2 (39.76) ***	5.1 (1.36)	0.61(0.256)
Usual (1,549)	58.8 (30.85)	4.0 (1.22)	0.45(0.214)
<b>Micronutrient (3,591)</b>			
Fe30 (1,200)	104.8 (27.04)	4.7 (0.66)	0.80 (0.158)
Fe60 (1,212)	104.8 (27.23)	4.7 (0.66)	0.80 (0.165)
MMN (1,179)	105.6 (27.26)	4.7 (0.67)	0.80 (0.162)

\* Average of ratio of the number of FS packages consumed to the number of FS packages assigned in each time period

\*\* Early group had significantly ( $p < 0.0001$ ) higher values than usual group.

\*\*\* Mean (SD)



Participation behaviors were also examined according to the level of duration (Table 5-15). Although both types of supplementation had the largest number of participants in the group of maximum period, the number of women who participated only for a shorter period was larger in FS than in MNS. The mean number of packages and pills increased as the duration increased, so did intensity of both types of supplementation. The intensities as well as the amount of supplement consumed by groups with shorter periods were much higher in MNS than in FS treatments.

[Table 5-15] Comparison of mean consumption and intensity by duration in MINIMat

Duration (Number of time periods)	Food			Micronutrient		
	n	Number of packages	Intensity*	n	Number of pills	Intensity
1	168	10.4 (7.50)	0.16 (0.190)**	28	22.6 (8.55)	0.44 (0.304)
2	171	27.4 (14.80)	0.30 (0.205)	45	44.3 (13.88)	0.58 (0.249)
3	295	42.8 (20.74)	0.40 (0.205)	125	64.7 (16.98)	0.67 (0.190)
4	696	59.5 (24.79)	0.48 (0.197)	525	86.7 (20.83)	0.75 (0.168)
5	912	74.0 (29.00)	0.58 (0.210)	2,868	111.9 (22.91)	0.82 (0.144)
6	1,030	94.9 (35.21)	0.68 (0.214)			
Total	3,272			3,591		

\* Average of ratio of the number of FS packages consumed to the number of FS packages assigned in each time period

\*\* Mean (SD)

### 5.3.3.3 Factors affecting persistent behaviors of utilizing food and micronutrient supplements

#### 5.3.3.3.1 Duration

Factors significantly associated with duration of participation were compared among food, micronutrient, and combined supplementation (Table 5-16). Among demographic characteristics, the greater the woman's age and parity, the longer she participated in all three

types of supplementation compared. In contrast, the greater her education, the shorter she participated in these interventions. Feeling uncomfortable receiving the ration away from home was significantly negatively associated with duration of FS and CS, whereas concerns about delivery positively affected duration of MNS. Factors reflecting better economic status of the household were negatively associated with durations of FS and CS and not with duration of MNS. With regard to program factors, participants in the 'early' food group had a significantly longer duration of FS and CS than women in the 'usual' group. Availability of MN pills was positively related to duration of MNS and CS. Experiencing more side-effects of MNS was related to increased durations of MNS and CS, which can be interpreted as increased episodes of side-effects as a result of longer participation.

Factors related to health beliefs were also significantly associated with durations: the greater the experiences of sicknesses, health problems, and physical weakness, the longer the duration. This was consistent in duration of FS, MNS, and CS. Perceived effects of the food and micronutrient supplements, examined in terms of increased strength, appetite, and weight gains of the women were related to longer durations. It is noteworthy that these positive perceptions of supplements could be either facilitators for further consumption of the supplements or just consequences of long enough participation to experience any positive effects of the supplements. Controlling behaviors over a woman by her family members, a type of domestic violence, significantly were significantly associated with decreased duration of MNS. Control over household finance and NGO membership were the only factors that showed significant associations among autonomy-related variables: as a woman had a greater control over her household finance, the duration of MNS increased and those with NGO memberships utilized FS and CS for a longer period than those without any NGO memberships. Factors that affected

[Table 5-16] Factors significantly (p<0.001) affecting durations of food, micronutrient, and combined supplementation among MINIMat participants

FS		MNS		CS	
Positive	Negative	Positive	Negative	Positive	Negative
<b>Maternal age*</b>	Years of education	<b>Maternal age</b>	Controlling behaviors	<b>Maternal age</b>	Years of education
<b>Parity</b>	Ration_discomfort	<b>Parity</b>		<b>Parity</b>	Ration_discomfort
'Early' FS group	Possession_hh items	Delivery_concern		'Early' FS group	Possession_hh items
<b>Sicknesses</b>	Shoes or clothes owned	MNS availability		MNS availability	Shoes or clothes owned
<b>Health problems</b>	Stable income	MNS side-effects		MNS side-effects	Stable income
<b>Physical weakness</b>		<b>Sicknesses</b>		<b>Sicknesses</b>	
FS_effects_strength		<b>Health problems</b>		<b>Health problems</b>	
FS_effects_health		<b>Physical weakness</b>		<b>Physical weakness</b>	
FS_effects_weight		<b>MNS_effects_appetite</b>		FS_effects_strength	
<b>MNS_effects_appetite</b>		<b>MNS_effects_strength</b>		FS_effects_health	
<b>MNS_effects_strength</b>		<b>MNS_positive effects</b>		FS_effects_weight	
<b>MNS_positive effects</b>		<b>Weight gains</b>		<b>MNS_effects_appetite</b>	
<b>Weight gains</b>		Control over finance		<b>MNS_effects_strength</b>	
NGO membership				<b>MNS_positive effects</b>	
				<b>Weight gains</b>	
				NGO membership	
				Influence of husband	

\*Variables significantly associated with all three duration measures were marked with boldface type

duration of CS were generally inclusive of factors related to FS or MNS except for positive influence of husbands on supplement consumption. Enrollment at non-lean season when food availability was greater than lean season was significantly negatively associated with duration of FS and CS. (see Appendix 4-3).

[Table 5-17] Factors included in the model explaining duration of food, micronutrient, and combined supplementation among MINIMat participants, analyzed by using full information maximum likelihood estimation<sup>†</sup>

Factors*	FS (n=3,272)		MNS (n=3,591)		CS (n=3,269)	
	parameter estimate	p-value	parameter estimate	p-value	parameter estimate	p-value
Parity	<b>0.0407</b>	<b>0.0235**</b>	<b>0.0316</b>	<b>0.0003</b>	<b>0.0869</b>	<b>0.0001</b>
Years of education	-0.0202	0.0009	-	-	-0.0163	0.0346
Delivery_concern	-	-	0.0763	0.0045	-	-
Ration_discomfort	-0.2603	<0.0001	-	-	-0.3013	<0.0001
'Early' FS group	1.1115	<0.0001	-	-	1.0656	<0.0001
MNS availability	-	-	0.2027	<0.0001	0.3397	<0.0001
MNS side-effects	-	-	0.1443	<0.0001	0.2554	0.0001
FS effect, strength	0.2885	<0.0001	-	-	0.2720	0.0007
MNS effect, appetite	-	-	0.1412	<0.0001	0.2298	0.0018
Weight gains	<b>0.5088</b>	<b>&lt;0.0001</b>	<b>0.3669</b>	<b>&lt;0.0001</b>	<b>0.8508</b>	<b>&lt;0.0001</b>
Physical weaknesses	<b>0.3232</b>	<b>&lt;0.0001</b>	<b>0.0819</b>	<b>0.0002</b>	<b>0.3618</b>	<b>&lt;0.0001</b>
Influence of husband	-	-	-	-	0.1819	0.0195
NGO membership	0.1878	0.0021	-	-	0.1741	0.0238
Controlling behaviors	-	-	-0.0850	0.0003	-	-
GA at enrollment	-0.0419	<0.0001	-	-	-0.0820	<0.0001
Season at enrollment	-0.1623	0.0010	-	-	-0.1812	0.0038

<sup>†</sup> AIC for FS is 76208.02, for MNS is 50658.22, and for CS is 90192.96

\* Factors with parameter estimates and p-values are variables selected in the model explaining duration of the corresponding supplementation

\*\* Parameter estimates and p-values of variables significantly associated with all three duration measures were marked with boldface type

Model selections were carried out through multivariable analysis with all variables with significant associations (Table 5-17). The positive relationship of parity, experiences of weight gain, and feeling physical weaknesses remained significant when duration in all types of supplementation compared, while the negative associations with economic factors disappeared in the multivariable model. Cultural factors, particularly uncomfortable feelings in receiving rations outside of house, were negatively affected duration of FS, while concerns about delivery were related to increased duration of MNS. Factors associated with FS, including being in the ‘early’ FS group and experience of effects of consuming food supplement were selected in the model for FS. Side-effects and benefits of taking MN pills were included in the model explaining MNS and CS. Finally, more years of education, higher gestational age at enrollment, and enrollment during non-lean season were negatively and having a NGO membership was positively associated duration of with FS and CS.

#### 5.3.3.3.2 Intensity

Factors that were significantly related to intensity were compared among food, micronutrient, and combined supplementation (Table 5-18). Overall, compared with duration measures, more factors were significantly associated with the intensity measures, and the directions of the associations with intensity were similar to the relationships with duration. As the age or the parity of participants increased, intensities significantly increased in all three types of supplementation. Those who were less educated consumed the supplements with significantly higher intensities in FS and CS than women who were more educated. Those who were better-off in economic status tended to consume the supplements with lower intensities. Better quality of program delivery, in terms of availability or acceptability of the supplements, was associated

[Table 5-18] Factors significantly affecting intensities of food, micronutrient, and combined supplementation among MINIMat participants

FS		Combined			
Positive	Negative	Positive	Negative	Positive	Negative
<b>Maternal age*</b>	Years of education	<b>Maternal age</b>	<b>Ration_discomfort</b>	<b>Maternal age</b>	Years of education
<b>Parity</b>	Delivery_fear	<b>Parity</b>	Balanced hh finance	<b>Parity</b>	<b>Ration_discomfort</b>
'Early' FS group	<b>Ration_discomfort</b>	Delivery_concern		'Early' FS group	Land area
FS acceptability	<i>Burkha</i> use	MNS availability		FS acceptability	Possession_hh items
FS side-effects	Land area	MNS acceptability		FS side-effects	Shoes or clothes owned
Influence of CNP	Possession_pond/ditch	Sicknesses		MNS availability	Distance to CNC
<b>FS_effects_strength</b>	Possession_hh items	Health problems		MNS acceptability	Waiting time at CNC
FS_effects_health	Shoes or clothes owned	<b>FS_effects_strength</b>		Health problems	
FS_effects_weight	Stable income	MNS_positive perceptions		MNS_positive perceptions	
<b>MNS_effects_appetite</b>	Food security	<b>MNS_effects_appetite</b>		Days to affect	
<b>MNS_effects_strength</b>	Distribution time	<b>MNS_effects_strength</b>		<b>FS_effects_strength</b>	
<b>MNS_positive effects</b>	Distance to CNC	<b>MNS_positive effects</b>		FS_effects_health	
Influence of husband	Waiting time at CNC	Days to affect		FS_effects_weight	
NGO membership		Weight gains		<b>MNS_effects_appetite</b>	
Control over finance				<b>MNS_effects_strength</b>	
Purchase				<b>MNS_positive effects</b>	
Self decision-making				Weight gains	
Earned income				NGO membership	
				Control over finance	
				Purchase	
				Earned income	

\*Variables significantly associated with all three duration measures were marked with boldface type

with increased intensity of women's consumption. Positive experiences with the supplements were associated with increased intensities. Having a membership in NGOs was significantly positively associated with both duration and intensity of FS and CS.

There were a few notable differences as well. In addition to feeling uncomfortable with receiving rations outside household, required *burkha* use and fear about delivery were negatively associated with the intensity of FS. With regard to program factors, compared with duration, favorable acceptability of the supplements had significant positive relationships with intensities of FS and MNS, while farther distance to CNC, and longer waiting time were negatively associated with the intensity of food and combined supplementation. The influences of the CNP on women's consumption of the supplements was significantly positively associated with intensity of FS. It is also noteworthy that the effects of beliefs on health susceptibility were no longer significant in relation to intensity of FS. As participants had pre-existing perceptions that iron pills had positive effects or that it took longer until they experienced any effects of iron pills, the intensity of MNS significantly increased. The influence of the husband on supplement consumption was significantly related to intensity of FS and, in contrast, to the duration of CS. In addition, more autonomy-related variables were significantly associated with intensity than with durations: the greater the autonomy of participants, the greater the intensities of FS and CS.

In addition, factors that affected intensities were compared with those that affected total consumption of the supplements. Even though the majority of factors had the similar effects on both types of utilization measurements in terms of direction and significance, some were different (Table 5-19). Most differences were that factors that were significantly associated with consumption of food packages were no longer significant in their associations with intensity of FS. Only pre-pregnancy weight was significantly related to the intensity of FS and not with the

[Table 5-19] Comparisons of parameter estimates of factors<sup>†</sup> associated with total consumption and intensity of food, micronutrient, and combined supplementation among MINIMat participants

Factors	FS (n=3,272)		MNS (n=3,591)		CS (n=3,269)	
	Total packages	Intensity	Total pills	Intensity	Total consumption	Intensity
Delivery_concern	1.9718***	0.0293	-	-	0.1431***	0.0293
Discomfort_outside	13.3620***	-0.0626	-	-	-	-
Balanced hh finance	-	-	-5.5300***	-0.0261	-	-
FS_side-effects	-	-	3.0264***	0.0143	-	-
MNS availability	6.5108**	0.0101	-	-	-	-
MNS acceptability	4.7922***	0.0175	-	-	-	-
MNS_side-effects	3.9978***	0.0082	-	-	-	-
Inconvenient distribution time	-0.1676**	-0.1214	-	-	-	-
Influences of CNP	-	-	-3.7829	-0.0436**	-	-
Sicknesses	1.6541**	-0.0022	-	-	-	-
Health_problem	13.1704**	-0.0133	-	-	-	-
Physical weakness	4.4993**	-0.0029	-	-	0.3267**	0.0281
Pre-pregnant weight	-0.0352	-0.0016**	-	-	0.2728**	0.0706
Previous preg experiences	4.0175***	0.0068	-	-	0.2728**	0.0706
FS effect_weight	-	-	2.7546	0.0201***	-	-
MNS information	-	-	-	-	0.3066***	0.1073
Pill importance, healthy	7.7934***	0.0209	-	-	0.4015*	0.1039
Pill importance, ill	-	-	-	-	0.1214	0.0716***
Living with in-laws	-	-	-	-	-0.1584**	-0.0488
Weight gain	6.9552**	0.0280	-	-	-	-
Controlling behaviors	-3.4054***	-0.0171	-	-	-	-
Physical, lifetime	-	-	-	-	0.1399***	0.0429
Physical, pregnancy	-	-	-4.5725***	-0.0204	-	-
Emotional, lifetime	-	-	-2.0828***	-0.0121	-	-
Emotional, pregnancy	-5.7676***	-0.0239	-	-	-	-
Sexual, pregnancy	-	-	-2.6445	-0.0196***	-	-
Influences, others	-	-	-3.0838***	-0.0136	-	-
GA at enrollment	-2.0026***	-0.0021	-	-	-	-
Season at enrollment	-	-	-2.4000***	-0.0065	-	-

<sup>†</sup>Parameters were estimated through full information maximum likelihood estimation

\*Average of ratio of the number of FS packages consumed to the number of FS packages assigned in each time period

\*\*Statistically significant at 0.001

\*\*\*Statistically significant at 0.05



total consumption of food supplements. Particularly, the effects of beliefs about health susceptibility, including experiences of sickness, health problems, or physical weaknesses, were significantly related to total consumption and not with intensity of FS and their direction of associations were opposite to one another. Inasmuch as similar differences were found between duration and intensity of FS as well, it can be assumed that those who experienced more episodes of illness, even though they participated in FS for a short period, might have consumed greater amount of food packages than those who less experienced illness, health problems, or physical weaknesses. Thus the significant associations of beliefs about susceptibility to illness with the total consumption disappeared when intensity, the ratio of total consumption and duration of participation, was considered.

Factors that differed in their associations between total pill consumption and intensity of MNS, did not coincide with those of FS (Table 5-19). Among them, influences of CNP, experiencing effects of FS in weight, and sexual violence during pregnancy were significantly associated with intensity of MNS and not with total pill consumptions.

Total consumption and intensity of combined supplementation had a few variables of different results as well (Table 5-19). Particularly, provision of information on the importance of micronutrient pills, perceived importance on taking iron tablets when ill, living with in-laws, and physical violence during lifetime, were different only for combined supplementation. Among these, only the perceived importance of taking iron pills when ill was significantly positively associated with combined intensity, but the association was not significant for combined total consumption.

In model selections of intensity of consuming supplements (Table 5-20), feeling discomfort in receiving rations was the only factor that was consistently and positively

[Table 5-20] Factors included in the model explaining intensity of food, micronutrient, and combined supplementation among MINIMat participants, analyzed by using full information maximum likelihood estimation<sup>†</sup>

Factors*	FS (n=3,272)		MNS (n=3,591)		CS (n=3,269)	
	parameter estimate	p-value	parameter estimate	p-value	parameter estimate	p-value
Maternal age	-	-	0.0018	0.0002	0.0084	0.0004
Years of education	-0.0070	<0.0001	-	-	-0.0156	<0.0001
Delivery_concern	-	-	0.0169	0.0096	-	-
Ration_discomfort	<b>-0.0298</b>	<b>0.0033</b>	<b>-0.0194</b>	<b>0.0042</b>	<b>-0.1172</b>	<b>0.0002</b>
<i>Burkha</i> use	-0.0259	0.0025	-	-	-	-
Land_area owned	-0.0001	0.0050	-	-	-	-
'Early' FS group	<b>0.1599</b>	<b>&lt;0.0001</b>	<b>-0.0109</b>	<b>0.0333</b>	<b>0.2806</b>	<b>&lt;0.0001</b>
Distribution time	-0.0267	0.0297	-	-	-	-
Distance to CNC	-0.0909	<0.0001	-	-	-0.1849	<0.0001
FS acceptability	0.0340	0.0067	-	-	0.0880	0.0241
FS side-effects	0.0460	<0.0001	-	-	0.0989	0.0017
MNS availability	-	-	0.0378	<0.0001	0.1185	0.0004
MNS acceptability	-	-	0.0279	<0.0001	0.0908	0.0045
Health problems	-	-	0.0370	<0.0001	0.0749	0.0029
FS effect, strength	0.0942	<0.0001	-	-	0.2212	<0.0001
MNS effect, appetite	-	-	0.0522	<0.0001	0.1485	<0.0001
Weight gains	-	-	0.0767	<0.0001	0.2270	<0.0001
Days to affect	-	-	0.0008	0.0006	0.0042	<0.0001
MNS_positive perceptions	-	-	0.0355	<0.0001	0.1399	0.0005
Influence of husband	0.0238	0.0183	-	-	-	-
NGO membership	0.0304	0.0046	-	-	-	-
Self decision-making	0.0056	0.0169	-	-	-	-
Earned income	0.0751	<0.0001	-	-	0.1940	<0.0001
Season at enrollment	-0.0203	0.0206	-	-	-	-

<sup>†</sup>AIC for FS is 99571.93, for MNS is 70128.62, and for CS is 99314.691

\*Factors with parameter estimates and p-values are variables selected in the model explaining duration of the corresponding supplementation

\*\*Parameter estimates and p-values of variables significantly associated with all three intensity measures were marked with boldface type

associated with intensities of all three types of supplementation. Being in the 'early' FS group also had significant relationships with these three measure but the direction was opposite between FS and MNS. Compared with the results of the antecedent analyses (Table 5-18), maternal age and parity were not significantly associated with intensity of FS any longer. The significant negative relationships with economic status of household disappeared in this multivariable analysis, except for a significant negative association between the area of land owned and intensity of FS. Program factors, including distribution time, distance to CNC, and acceptability of food supplements and influences of the husband on supplement consumption remained significant in relation to the intensity of FS. Acceptability, availability, and positive perceptions on iron pills were significantly associated with the intensity of MNS. Experiencing benefits of the supplements were also associated with increased intensities of FS and MNS. Finally, among autonomy-related variables, decision-making power of women, existence of earned income, and having a NGO membership were remained significantly associated with the intensity of FS.

#### 5.3.3.3.3 Patterns

Different patterns of intensities in early and late pregnancy were examined (Table 5-21). Participants with consistently high intensity in early and late pregnancy were greater (42%) in MNS than in FS (26%). During early pregnancy, more participants consumed the food supplements with lower intensity, whereas more consumed micronutrient pills with greater intensity. Although this tendency held in late pregnancy for micronutrient, those who consumed food packages with high intensities in late pregnancy were greater in the number than those with low intensity. For CS, only 12 % maintained high intensities throughout the pregnancy, which

implies that, among those who had consistently high intensities for food or micronutrients, many did not consume the other supplement with high intensity throughout the pregnancy.

[Table 5-21] Frequencies of patterns in food, micronutrient, and combined supplementation among MINIMat participants

	FS	MNS	Pattern (FS/MNS)	CS
High-high	856 (26.2)*	1,500 (41.8)	High-high/high-high	397 (12.1)
High-low	259 (7.9)	757 (21.0)	High-high/mixed	458 (14.0)
Low-high	1,035 (31.6)	559 (15.6)	Mixed/high-high	974 (29.8)
Low-low	1,122 (34.3)	775 (21.1)	Mixed/mixed	1,440 (44.05)

\* N (%)

Factors significantly associated with these patterns of intensities were compared among food, micronutrient, and combined supplementation (Table 5-22). Factors that were related to intensities were inclusive of factors associated with patterns of intensities in FS, MNS, and CS. Although there were factors that showed different relationships among outcome variables, the associations of some factors with duration, intensity, and pattern of FS remained the same. These includes maternal age, parity, years of education, uncomfortable feeling in receiving food rations outside household, household items possessed, ownership of clothing and footwear, being in 'early' FS group, experiencing effects of FS and MNS, and having a membership in NGOs.

Factors that were negatively associated with utilization behaviors of MNS (including duration, intensity, and pattern) differed. More factors, however, were consistently associated with these three measures of MNS, such as maternal age, parity, concerns about delivery, availability of micronutrient pills, and experiencing sicknesses, health problems, effects of MNS, or weight gains. Factors related to the pattern of CS were similar to those related to duration and

[Table 5-22] Factors affecting patterns of intensities of food, micronutrient, and combined supplementation among MINIMat participants

FS		MNS		CS	
Positive	Negative	Positive	Negative	Positive	Negative
<b>Maternal age*</b>	Years of education	<b>Maternal age</b>		<b>Maternal age</b>	Years of education
<b>Parity</b>	Ration_discomfort	<b>Parity</b>		<b>Parity</b>	Ration_discomfort
'Early' FS group	Land area	Delivery_concern		'Early' FS group	
FS_effects_strength	Possession_hh items	MNS availability		FS_effects_strength	
FS_effects_health	Shoes or clothes owned	MNS acceptability		<b>MNS_effects_appetite</b>	
FS_effects_weight	Distance to CNC	Sicknesses		MNS_effects_strength	
<b>MNS_effects_appetite</b>		Health problems		<b>MNS_positive effects</b>	
<b>MNS_positive effects</b>		Physical weakness		Self decision-making	
NGO membership		MNS_positive perceptions		Earned income	
Self decision-making		<b>MNS_effects_appetite</b>			
Earned income		MNS_effects_strength			
		<b>MNS_positive effects</b>			
		Weight gains			

\*Variables significantly associated with all three duration measures were marked with boldface type

intensity, except that factors related to economic status, program delivery, beliefs on health susceptibility, and social influences were no longer significant. The positive effects of self decision-making power on the pattern of CS were unique in pattern compared with the other utilization measures. Finally, maternal age, parity, and experiencing effects of micronutrient supplements consistently had significant positive associations with all three pattern measures.

In the model selections (Table 5-23), factors affecting patterns were quite different between FS and MNS. As for the patterns of intensity of FS, participants who consumed the supplements with high intensities throughout the pregnancy had fewer years of education, less culture-bound discomforts, earned incomes, shorter travel distances to CNC, more experiences with effects of the food packages, particularly increased strength, and greater self decision-making power on consuming the supplements than those who consumed the food packages with consistently or mixed with lower intensities. Those assigned in the ‘early’ FS group also showed consistently high intensities of FS. In the case of MNS, women who were older, were more concerned about delivery, experienced more illness episodes, and had positive perceptions and benefitted from the MN pills, (with an increase in appetite in particular), exhibited consistently high intensity in taking the MN pills. Women who consumed both types of supplements with a high intensity were significantly associated with older maternal age, fewer years of education, discomfort in receiving food rations, greater morbidity, greater effects of the supplements experienced, ‘early’ food intervention group, greater decision-making power of own, and existence of earned income.

[Table 5-23] Factors included in the model explaining consumption of supplements with continuously high intensities in food, micronutrient, and combined supplementation among MINIMat participants, analyzed based on 10 imputed dataset created by using MCMC method and EM algorithm<sup>†</sup>

Factors*	FS (n=3,272)		MNS (n=3,591)		CS (n=3,269)	
	parameter estimate	p-value	parameter estimate	p-value	parameter estimate	p-value
Maternal age	-	-	0.0259	<0.0001	0.0263	0.0165
Years of education	-0.0788	<0.0001	-	-	-0.0396	0.0085
Delivery_concern	-	-	0.3001	0.0032	-	-
Ration_discomfort	-0.2876	0.0356	-	-	-0.4313	0.0085
‘Early’ FS group	2.2573	<0.0001	-	-	2.1729	<0.0001
Distance to CNC	-0.5323	<0.0001	-	-	-	-
MNS availability	-	-	0.5631	<0.0001	-	-
MNS acceptability	-	-	0.4122	<0.0001	-	-
Sicknesses	-	-	0.0996	<0.0001	-	-
FS effect, strength	0.5987	<0.0001	-	-	0.4182	0.0033
MNS effect, appetite	-	-	0.5628	<0.0001	0.4600	0.0051
Weight gains	-	-	0.6191	<0.0001	-	-
Days to affect	-	-	-	-	-	-
MNS_positive perceptions	-	-	0.3477	0.0058	-	-
Self decision-making power	0.1127	<0.0001	-	-	0.1181	0.0034
Earned income	0.7409	<0.0001	-	-	0.5141	0.0057
Season at enrollment	-0.2068	0.0403	-	-	-	-

<sup>†</sup>Max-rescaled R<sup>2</sup> for FS is 0.31, for MNS is 0.09, and for CS is 0.21

\*Factors with parameter estimates and p-values are variables selected in the model explaining duration of the corresponding supplementation

\*\* Parameter estimates and p-values of variables significantly associated with pattern measures in all three supplementation were marked with boldface type

#### 5.3.3.3.4 Persistent consumption

Persistent consumers, those who consumed the supplements with a consistently high intensity for a long period were compared with the rest of the participants (Table 5-24). The proportion of persistent consumers was the greatest in MNS, while only 10% were persistent

consumers in CS. Although persistent consumers utilized the supplements for a significantly longer duration and with a greater intensity in all types of supplementation, the differences of durations and intensities of the two comparison groups were greater in FS.

[Table 5-24] Comparison of frequency, duration, and intensity between persistent consumers and others in food, micronutrient, and combined supplementation in MINIMat

	FS		MNS		CS	
	Persistent consumers	Others	Persistent consumers	Others	Persistent consumers	Others
Frequency*	752 (23)	2,520 (77)	1,268 (35)	2,323 (65)	325 (10)	2,944 (90)
Duration** (in periods)	5.7 ± 0.44	4.2 ± 1.41 <sup>†</sup>	5.0 ± 0.00	4.6 ± 0.78 <sup>†</sup>	11.8 ± 0.41	10.1 ± 1.76 <sup>†</sup>
Intensity**	0.8 ± 0.09	0.5 ± 0.21 <sup>†</sup>	0.9 ± 0.05	0.7 ± 0.15 <sup>†</sup>	0.9 ± 0.05	0.6 ± 0.14 <sup>†</sup>
Standardized intensity**	1.2 ± 0.36	-0.4 ± 0.84 <sup>†</sup>	0.8 ± 0.28	-0.5 ± 0.95 <sup>†</sup>	1.0 ± 0.22	-0.1 ± 0.69 <sup>†</sup>

\*N(%)

\*\* Mean ± SD

<sup>†</sup>Two sample t-test between persistent consumers and others, significant at 0.05.

Factors that were significantly associated with persistent consumption were also examined (Table 5-25). Similar to other utilization measures, maternal age and parity were positively related to persistent consumers of food, micronutrient, and combined supplementation. In contrast, feeling uncomfortable receiving food rations outside household was significantly negatively associated with all three supplementation groups. Persistent consumers of FS were more likely to be in the ‘early’ FS group, experience benefits of consuming food packages, have a membership in NGOs, and have greater autonomy than non-persistent consumers of FS. The former also had worse economic status, were less educated, experienced fewer inconveniences in program delivery, and were not required to get permission from family members to go out of the house than others. Those who consumed micronutrient pills persistently were more likely to be



[Table 5-25] Factors associated with persistent consumers of food, micronutrient, and combined supplementation among MINIMat participants

FS		MNS		CS	
Positive	Negative	Positive	Negative	Positive	Negative
<b>Maternal age</b>	Years of education	<b>Maternal age</b>	<b>Ration_discomfort</b>	<b>Maternal age</b>	Years of education
<b>Parity</b>	<b>Ration_discomfort</b>	<b>Parity</b>		<b>Parity</b>	<b>Ration_discomfort</b>
'Early' FS group	Land area	Delivery_concern		Health problems	
<b>FS_effects_strength</b>	Possession_hh items	<i>Burkha</i> use		MNS_effects_appetite	
FS_effects_health	Shoes owned	MNS availability		MNS_effects_strength	
FS_effects_weight	Distance to CNC	MNS acceptability		MNS_positive effects	
NGO membership	Permissions	Sicknesses		<b>FS_effects_strength</b>	
Self decision-making		Health problems		Earned income	
Earned income		MNS_positive perceptions			
		MNS_effects_appetite			
		MNS_effects_strength			
		MNS_positive effects			
		<b>FS_effects_strength</b>			
		Weight gains			

concerned about delivery, have greater availability and acceptability of MNS, experience more health problems, have positive attitudes toward iron pills, and experience benefits of taking food and micronutrient supplements and weight gains. Far fewer factors were significantly associated with persistent consumption when considering FS and MNS simultaneously than each supplementation separately. In particular, no factors related to program delivery, social influences, and economic status of the household were significantly associated with CS.

The results of multivariable analyses that included factors that were significant in the preceded analyses (Table 5-25) for each type of supplementation together are presented (Table 5-26). With regard to FS, the significant relationships between persistent consumers and NGO membership and economic status related factors disappeared in the multivariable analysis. As for MNS, most of the factors significant in the previous analysis were remained significant in the model selection, except uncomfortable feelings about receiving food rations outside household. Persistent consumers of both Fs and MNs were associated with at least one factor from each dimension of the theoretical model except economic status and social influence. Maternal age was positively associated and gestational age was negatively associated with persistent consumption of all three types of supplementation.

[Table 5-26] Factors included in the model explaining persistent utilization of nutrition supplements in food, micronutrient, and combined supplementation among MINIMat participants, analyzed based on 10 imputed dataset created by using MCMC method and EM algorithm<sup>†</sup>

Factors*	FS (n=3,272)		MNS (n=3,591)		CS (n=3,269)	
	parameter estimate	p-value	parameter estimate	p-value	parameter estimate	p-value
Maternal age	<b>0.0254</b>	<b>0.0073</b>	<b>0.0221</b>	<b>0.0012</b>	<b>0.0391</b>	<b>0.0005</b>
Years of education	-0.0811	<0.0001	-	-	-0.0337	0.0394
Delivery_concern	-	-	0.2834	0.0030		
Ration_discomfort	-0.3655	0.0025	-	-	-0.5431	0.0019
<i>Burkha</i> use	-	-	0.2324	0.0020		
'Early' FS group	2.5028	<0.0001	-	-	2.3582	<0.0001
Distance to CNC	-0.6795	<0.0001	-	-		
MNS availability	-	-	0.6469	<0.0001		
MNS acceptability	-	-	0.4255	<0.0001		
Sicknesses	-	-	0.0715	0.0112		
Health problems	-	-	0.5122	<0.0001	0.4236	0.0014
FS effect, strength	0.6255	<0.0001	-	-	0.3851	0.0323
MNS effect, appetite	-	-	0.6004	<0.0001	0.4663	0.0112
Weight gains	-		0.4990	0.0019		
MNS_positive perceptions	-	-	0.4092	0.0021	-	-
Self decision-making power	0.0907	0.0113	-	-		
Earned income	0.7560	<0.0001	-	-	0.6286	0.0011
GA at enrollment	<b>-0.0518</b>	<b>0.0296</b>	<b>-0.0557</b>	<b>0.0013</b>	<b>-0.0647</b>	<b>0.0380</b>
Season at enrollment	-0.2221	0.0394	-	-		

<sup>†</sup>Max-rescaled R<sup>2</sup> for FS is 0.34, for MNS is 0.13, and for CS is 0.22

\* Factors with parameter estimates and p-values are variables selected in the model explaining duration of the corresponding supplementation

\*\* Parameter estimates and p-values of variables significantly associated with persistent consumers in all three types of supplementation were marked with boldface type

#### 5.3.3.3.5 Sequence of initiation of consuming supplements

Among those who initiated both types of supplementation (n=3,269), 881 (27%) women started FS ahead of MNS, while 1,363 (42%) initiated MNS first. The rest of the participants (1025, 31%) were presumed to start both kinds of supplementation around the same time. Basic

characteristics of participants in each sequence group were compared (Table 5-27). Women who started MNS before FS tended to have enrolled in later stage of pregnancy than those started FS before MNS ( $p=0.0491$ ). As expected, participants in 'early' group of FS were more likely to belong to the group that started FS then MNS than 'usual' group ( $p<0.0001$ ). The odds of initiating FS then MNS were greater among women from household without stable outcome ( $p=0.0310$ ) than that of those who started MNS ahead of FS.

In addition, other external and psychosocial factors were compared and those that were significantly different between the two sequence groups are presented in Table 5-27. Compared with participants who initiated MNS then FS, those who started FS first were more likely to feel that receiving their rations outside the household was comfortable, experience diseases previously, and have earned income.

Differences in various participation behaviors between the two sequence groups were also examined (Table 5-28). Women who initiated FS then MNS participated in food and combined supplementation for a longer period on average, consumed supplements with greater intensities in all three types of supplementation, and maintained higher intensities of food and combined supplementation in early and late pregnancy than those with sequence of MNS then FS. In addition, none of the participants who started to consume MNs before Fs was a persistent consumer of food and combined supplementation, while the proportion of persistent consumers of MNs was slightly greater than that of participants who initiated FS then MNS.

[Table 5-27] Comparison of basic characteristics between different sequence groups among MINIMat participants

Factors	Sequence 1 (FS before MNS)	Sequence2 (MNS before FS)	p-value
<b>GA at enrollment (wk)</b>	1,363, 8.9 ± 2.09*	881, 9.1 ± 2.15	0.0491
<b>Maternal age (years)</b>	1,363, 26.2 ± 5.90	881, 25.9 ± 6.02	0.2687
<b>Years of education (years)</b>	1,363, 4.9 ± 4.04	881, 5.2 ± 4.07	0.0502
<b>Pre-pregnancy weight (kg)</b>	1,183, 45.0 ± 6.19	779, 45.2 ± 6.79	0.4413
<b>FS group</b>			
Late	135(15.3)**	745 (84.7)	<0.0001, 0.02 (0.016, 0.026)***
Early	1,228 (90.0)	136 (10.0)	
<b>Season at enrollment</b>			
Lean	967 (59.6)	656 (40.4)	0.0694, 1.194 (0.986, 1.446)
Non-lean	396 (63.8)	225 (36.2)	
<b>Existence of stable income</b>			
Yes	585 (58.3)	419 (41.7)	0.0310, 0.829 (0.699, 0.983)
No	778 (62.7)	462 (32.3)	
<b>Status of household income and expenditure</b>			
Income ≥ Expenditure	1,097 (61.0)	702 (39.0)	0.6166, 1.056 (0.853, 1.306)
Income < Expenditure	262 (59.7)	177 (40.3)	
<b>Feeling receiving ration outside household</b>			
Uncomfortable	748 (58.6)	528 (41.4)	0.0057, 0.728 (0.581, 0.912)
Comfortable	294 (66.1)	151 (33.9)	
<b>Previous diseases experience</b>			
Yes	144 (68.3)	67 (31.7)	0.0195, 1.435 (1.060, 1.943)
No	1,219 (60.0)	814 (40.0)	
<b>Existence of earned income of the participant</b>			
Yes	128 (67.7)	61 (32.3)	0.0406, 1.393 (1.014, 1.914)
No	1,235 (60.1)	820 (39.9)	

\*N, mean ± SD

\*\* N (%)

\*\*\*Odds ratio of belong to 'Sequence 1' group

[Table 5-28] Comparison of participation behaviors between different sequence groups among MINIMat participants

Factors	Sequence 1 (FS before MNS) (n=1,363)	Sequence2 (MNS before FS) (n=881)	p-value
<b>Duration</b>			
FS	5.5 ± 1.14*	3.2 ± 1.04	<0.0001
MNS	4.7 ± 0.71	4.8 ± 0.48	<0.0001
Combined	11.12 ± 1.68	9.0 ± 1.34	<0.0001
<b>Intensity</b>			
FS	0.60 ± 0.24	0.40 ± 0.21	<0.0001
MNS	0.81 ± 0.17	0.79 ± 0.15	0.0413
Combined	0.19 ± 0.77	-0.27 ± 0.65	<0.0001
<b>Pattern</b>			
FS			
high-high	644 (47.2) **	24 (2.7)	<0.0001
others	719 (52.8)	857 (97.3)	
MNS			
high-high	561 (41.2)	382 (43.4)	0.3024
others	802 (58.8)	499 (56.6)	
Combined			
high-high	304 (22.3)	11 (1.3)	<0.0001
others	1,059 (77.7)	870 (98.7)	
<b>Persistent consumer</b>			
FS			
Yes	613 (45.0)	0 (0)	<0.0001
No	750 (55.0)	881 (100.0)	
MNS			
Yes	463 (34.0)	344 (39.0)	<0.0001
No	900 (66.0)	537 (61.0)	
Combined			
Yes	265 (19.4)	0 (0)	<0.0001
No	1098 (80.6)	881 (100.0)	

\*N, mean ± SD, \*\* N (%)

#### 5.3.3.3.6 Sharing and replacement

Sharing the food supplements with others and replacing the home diet with the food

supplements were examined. Out of 3,272 participants, a total of 2,423 (74%) reported that they ever shared their food packages with their children or others, while 60% of participants responded that they never consumed the supplements in place of their home diet. The proportion of women who reported sharing at 3 or more monthly visits was 38%, which implies that sharing was prevalent among the participants. In contrast, the majority of the participants, 1,108 out of 1,321 who ever reported replacement of their home diet by the food supplements, reported the replacement at one or two monthly visits out of the total of 6 visits. Although pregnant women were expected to consume all the assigned food supplements at the CNC, except those who were in their later stage of pregnancies, more than 30% of the participants revealed that they usually could not finish their packages, which made it possible for them to bring the leftovers home and thus to share them with others or use them to replace their own meals.

Factors associated with sharing were quite different from those of replacement (Table 5-29). Older age, higher parity, more health problems or physical weaknesses experienced, more domestic violence, and greater autonomy were positively associated with sharing behaviors. In contrast, there were no factors with significant negative associations with sharing of Fs at a corrected significance level. Women who experienced various types of violence were more likely to share the food supplements with others than those who did not experience domestic violence. Replacement behaviors were positively associated with only factors reflecting health beliefs and attitudes toward supplementation, while cultural, economic, and social factors were negatively related to replacement. Only perceptions of poor health status were positively associated with both behaviors.

[Table 5-29] Factors associated with other participation behaviors regarding food supplementation among MINIMat participants

\* Means pregnancy

Sharing		Replacement	
Positive	Negative	Positive	Negative
Maternal age		<b>Sicknesses</b>	<i>Burkha</i> use
Parity		<b>Health problems</b>	Possession_pond/ditch
<b>Health problems</b>		<b>Physical weakness</b>	MNS_negative perceptions
<b>Physical weakness</b>		FS_effects, health	Sexual violence, life
MNS_positive perceptions		MNS_effects_appetite	Influence of sister-in-law
Physical violence, life		MNS_effects_strength	Control over finance
Emotional violence, life		MNS_positive effects	
Emotional violence, preg*			
Control over finance			
Mobility			
Self decision-making			

## 5.4 Discussion

The unique setting of MINIMat that provided both food supplement packages and micronutrient pills simultaneously to pregnant women made it possible to examine participation behaviors of one type of supplementation in the presence of the other type of supplementation. It was also novel to examine differential participation behaviors toward the two types of supplementation and factors associated with the behaviors. Moreover, the effects of sequence of introducing the two kinds of supplements on various participation behaviors were notable.

Overall, participation behaviors of pregnant women in this study, examined in terms of initiation, duration, intensity, and pattern, showed that MNS was utilized more than FS when provided simultaneously. Utilizing FS was also a limiting factor when considering participation in the combined supplementation. Participants who initiated FS before MNS showed greater level of participation in FS in all measures that reflected the utilization of food supplements. Moreover, those who consumed the nutrition supplements with a persistently high level



throughout the entire pregnancy were only 23%, 35%, and 10% of the total participants in FS, MNS and CS, respectively. Although external factors were consistently associated with all participation measures in all types of supplementation, internal factors were more associated with persistent utilization of supplementation. Particularly, MNS was related to positive perceptions and attitudes toward supplementation, while FS was associated with women's autonomy.

#### ***5.4.1 Participation behaviors***

All participation behaviors, including initiation, earlier initiation, duration, intensity, pattern with a high-high intensity, and persistent consumption, were greater in MNS than in FS. The average intensity of consuming the micronutrient supplements among MINIMat participants was comparable to many studies', particularly those conducted in neighboring countries <sup>29,33,222</sup>. At high intensity, the supplement consumption of MINIMat participants was also sufficient to achieve a maximal response of blood hemoglobin among pregnant women suggested by Ekstrom et al. (2002) <sup>160</sup> such that 82 % of Fe30 MN pill and MMN consumers and 93% of women in the Fe60 group satisfactorily achieved the minimum requirement of Fe, 2,400 mg. Likewise, there were no differences in the hemoglobin concentrations and the proportions of anemic pregnant women across the three micronutrient groups<sup>107</sup>. In addition, it was notable that there were no differences in the consumption of micronutrient pills across the MNS groups even though the amounts of iron were different. This showed that the high dose (60mg Fe) of micronutrient pills can be consumed as persistently as iron supplements with low dose (30mg Fe), which provides meaningful findings for considering iron supplement guidelines for pregnant women<sup>223,224</sup>.

The level of Fs consumption among MINIMat participants was relatively low. The

average intensity of food supplementation was 0.54, less than that of previous studies, of which adherence levels were 61-89%<sup>106,149,151,154,225,226</sup>. The intensity of persistent food supplement users in MINIMat, 0.8, however, was comparable to that in other studies.

On average, about 40,000 kcal was provided to women who stayed in the study long enough to initiate Fs consumption, a substantial amount of energy compared to the energy cost of pregnancy, which has been reported to range from 55,000 to 85,000 kcal<sup>227-230</sup>. Most (83%) participants either shared the food supplement or used it to replace their home diet, and if these behaviors reduced the energy available from the food supplement by 10%, these behaviors would reduce the availability of the food supplement to increase the birth weights of babies as well<sup>152</sup>. As a result, the actual net energy gain from the food supplements should be assumed to be less than reported but by an unknown amount. The high proportion of sharing and replacement behaviors in this population may help to account for the lower-than-expect effects of the supplements on birthweight in MINIMat<sup>107</sup>.

Considering both types of supplementation together, initiation and utilization of FS was a limiting factor in combined participation behaviors. Those who showed better participation behaviors in FS also participated in MNS thoroughly, but the reverse was not true: among those who initiated FS (n=3,422), only 59 (1.7%) did not initiate MNS and 89% of earlier FS initiators started their MNs consumption earlier in their pregnancies. This same trend held in utilization measures, such as duration, intensity, and persistent consumption. For example, 92% of participants who consumed the food supplements for the longest duration also consumed micronutrient supplements with a maximum length, while only 36% of participants who utilized micronutrient supplementation in the full period consumed food supplements for the same length. This implies that when the two types of supplementation are provided jointly, efforts

made to increase FS participation could contribute to improving overall participation.

The lower initiation and utilization rates of FS compared to MNS can be attributed to a few program features. Although micronutrient supplements were provided through monthly home visits, women needed to come to CNC daily to acquire and consume food supplements, which could have been difficult for pregnant women. This is likely because living farther from the CNC, inconvenient distribution time, and longer waiting time at the CNC were negatively associated with persistency measures as in other studies<sup>41,43,70,98,162,231,232</sup>. Feeling uncomfortable about receiving rations outside the household was prevalent in the study region and was also related to decreased utilization of both kinds of supplements. Moreover, MINIMat participants in the qualitative study revealed in the interviews that consuming food packages was more cumbersome than taking micronutrient pills because participants needed to travel to the CNC and before eating, they had to wash their hands and mix all four ingredients<sup>233</sup>, which implied that simplicity in taking supplements mattered for the level of participation in this study population. Therefore, to improve participation in FS, the modes of delivering food supplement packages need to be modified to be easier and more accessible.

The associations between the sequence of initiating the two types of supplementation and participation behaviors were notable because women who started FS first showed greater overall participation than those who initiated MNS then FS. Participants who started FS then MNS tended to consume Fs for a longer duration, with a greater intensity, and with a higher rate of ‘high-high’ pattern than those initiated MNS then FS. In contrast, among those who started MNS ahead of FS, none was a persistent consumer of FS and combined supplementation. There can be factors that explain these participation features other than the sequence of supplementation initiation. For example, inasmuch as the majority of pregnant women who started FS then MNS

belonged to the ‘early’ food supplementation group, strong recommendations for early initiation and active consumption of food supplements provided to this intervention group by health professionals might have contributed to the greater participation of women with the sequence of FS then MNS. Given that not all the features of utilization measures of this sequence group were conformed to those of the ‘early’ food supplementation group, however, it can be concluded that the sequence of initiating supplementation were associated with participation behaviors independent of the food intervention group. When food and micronutrient supplements are provided jointly, the sequence of introducing the supplements should be considered as well.

Those who possibly benefited the most from MINIMat in terms of the amount of supplements received were the persistent users who consumed both kinds of supplements with a consistently high intensity throughout pregnancy. These persistent users were best represented by a pattern that considered duration and intensity together. Among other persistency measures, average intensity was the second best proxy for participants who made the most use of the services that MINIMat offered. Therefore, to precisely identify those who utilized the services most, it is necessary to consider multiple persistency measures simultaneously. In MINIMat, average intensity seemed to capture the persistent users fairly well.

## ***5.4.2 Factors affecting participation behaviors***

### **5.4.2.1 Demographic variables**

The associations of demographic factors with initiation were similar in FS and CS, while their associations with utilization of FS and MNS were different each other. The results of multivariable analysis indicate that education was negatively associated with initiation and all persistency measures in FS and CS, while education were not significantly associated with MNS.

The lack of associations with education on MNS consumption differed from results of previous studies as more years of schooling was positively associated with MNs consumption in the US<sup>20,234</sup>, Cambodia<sup>235</sup>, and three European countries<sup>234</sup>, but women with more education consumed fewer pills<sup>171</sup> or did not consume MN pills<sup>232</sup> in Nepal and Indonesia, respectively. Therefore, the finding of this study adds more evidence to the previously reported assertion that the relationship between education and utilization of MNS is study area-specific<sup>171</sup>

In contrast, maternal age or parity had positive relationships with all utilization measures of MNS. These positive associations between MNS and maternal age were comparable to others studies' because increased consumption of MN pills among women with greater age has been reported in western and less-developed countries in common<sup>36,171,234-238</sup>. Although the relationship between parity and MN pill consumption has varied previously<sup>20,171,207,232,234,236-239</sup>, the positive association of parity with utilization behaviors in this study was comparable to the relationship shown in a neighboring country, Nepal<sup>171,236</sup>. This is likely because maternal age or parity is closely related to health-seeking behaviors of pregnant women in South Asia where women who are older tend to have a higher parity, which allows these women to have more exposures to health care systems and be familiar with nutrition supplement, particularly iron pills.

#### 5.4.2.2 Cultural beliefs and practices

The fear of having a large baby and bleeding during delivery, perceived locally as results of taking iron pills, were two important cultural barriers to the consumption of MNs reported in previous studies<sup>70,85,101,102,180</sup>. In this study, however, concerns about the size of a baby were not significantly associated with initiation and utilization of FS and MNS. Although women who were concerned about the baby's size were significantly less likely to initiate FS and to be

persistent users of MNs than those who were not concerned about their babies' size, this relationship did not remain significant in the multivariable analysis. Inasmuch as it was also revealed in the qualitative study (Chapter 2 and 3) <sup>233</sup> that a large-sized fetus was not much of a concern among pregnant women, this concern was probably not an explanation for reduced uptake of nutrition supplements among pregnant women in this study.

Instead, concerns about delivery, for reasons not specified but expected to be associated with delivery-related fears, were associated with participation behaviors. Having frequent thoughts about delivery was consistently positively associated with all types of utilization measures of MNS in the multivariable analysis. This implies that participants who frequently thought about their deliveries might have perceived the micronutrient pills as beneficial to their deliveries and thus consumed the pills persistently. Having frequent thoughts about delivery was also inversely related to initiation of FS and CS, however, which indicates that there were pregnant women who concerned about their deliveries but regarded the food packages as unhelpful to their deliveries and hence did not initiate FS in the first place. Thus, this factor was differentially associated with FS and MNS, but at the different stages in the participation of nutrition supplementation. This finding is noteworthy not only because associations with one factor were different between FS versus MNS but also because it illustrates the importance of examining initiation and utilization of nutrition supplementation separately.

Perceptions and practices pertaining to women's going out were significantly associated with participation behaviors as well. Feeling uncomfortable when receiving food rations outside the house was consistently negatively associated with all utilization measures of food and combined supplementation and intensity of MNS in the multivariable analysis. This needs attention because such consistent significant relationships across different supplementation and

participation behavior measures were not found for other variables. Needing to use a *burkha* when going out of the house had a positive relationship with persistent consumption of MNs and a negative association with intensity of FS in multivariable analysis. The negative associations with these cultural features on initiation and utilization of FS were obvious because procurement and consumption of Fs required that the participants leave their houses. This is also comparable to previous studies as it has been reported that the uptake of health services, particularly antenatal cares, was closely linked to cultural practices of women's going out in South Asian countries<sup>38,145</sup>. The lower intensity of MNS among participants who felt uncomfortable receiving food rations outside the house is notable because receiving MN pills did not involve women's going out but feeling uneasy about obtaining MNs from an outsider still strongly affected the behaviors of the participants.

#### 5.4.2.3 Economic status of household

Overall, participants who were better off economically were less likely to initiate and persistently consume the food supplements. This inverse relationship of economic status of household and participation in FS has been reported in other studies. Among women in the Institute of Nutrition of Central America and Panama (INCAP) study, those who consumed greater amount of supplements during two consecutive pregnancy and a lactation period in between were poorer than women with less consumption<sup>172</sup>. In a study conducted in East Java, Indonesia, women who refused to consume energy supplements were economically better off than other participants<sup>69</sup>. In Bangladesh, participants in BINP were more likely to be in the group of lowest household expenditure than non-participating pregnant women<sup>18</sup>.

Better economic status of household was also significantly negatively associated with participation behaviors of MNS in MINIMat, even though these relationships did not remain

significant in the multivariable analysis. One explanation for the loss of significant negative relationship is the negative correlations between economic factors and maternal age or parity in this study. Particularly, those of higher parity were highly significantly worse-off than those with a lower parity. These relationships could have attenuated the effects of economic status on participation behaviors in the multivariable analysis. According to previous research, an inverse relationship between economic status of household and uptake of MNs were reported when the supplements were free of charge<sup>171,222</sup> and positive associations if the MNs consumption was prescribed or recommended<sup>211,232,238</sup>. These disparities can be attributed to the fact that most of the previous studies reported unadjusted odds ratios of economic status and MN pill consumption. As shown in one study<sup>232</sup>, the significant negative relationship between wealth index and iron/folic acid pills disappeared (except in the poorest quintile group) when adjusted for other variables, including maternal age and birth order of the baby of interest.

In this study, seasonality was considered as a factor that influenced food availability of a household and hence nutrition intake as reported in other studies<sup>218-220</sup>. Seasonality was significantly associated with initiation and utilization of FS (see Appendix 4-2, 4-3, 4-4, 4-5, and 4-6). Participants who enrolled in the lean period when crops were relatively less available were more likely to initiate and persistently utilize FS than those enrolled in the non-lean season. These relationships between seasonality and FS, rather than MNS, are comparable to previous findings from a study in Gambia where pregnant women actually consumed food supplements during a season when food was scarce, which was associated with a profound effect on birth weights of newborn babies<sup>3,7</sup>. Therefore, participants who enroll in a nutrition supplementation program when food is less available might have more potential to benefit from the program than those enrolled in the other times. Therefore, in future studies, the effect of seasonality needs to be



statistically adjusted to avoid confounding effects on the outcomes of interest.

#### 5.4.2.4 Features related to program delivery

It was difficult to examine the relationship between initiation and program factors because most of the data about program-related variables were collected in later stages of pregnancy. It was possible, however, to determine that utilization of the supplements was associated with various features of the program. The most important results were the negative relationships of a long distance to the CNC with FS utilization and positive associations of the availability and acceptability of the supplements with all utilization measures of MNS. Inasmuch as the adverse influences of a long travel distance on access to antenatal care services<sup>41,43,231</sup> or procurement of MNS<sup>70,98,162,232</sup> have been reported in other studies and similar results were also found in our qualitative study<sup>233</sup>, the decreased consumption of the Fs among MINIMat participants who needed to come to the CNC after a long travel seems easy to explain.

The intensity of consumption of FS and MNS, more than other utilization measures, was significantly associated with other program factors in the adjusted analysis. If participants did not experience any inconvenience in the time of distributing Fs or waiting time at the CNC, binary variables, they consumed the supplements with a significantly increased intensity. The availability of MNS was also significantly positively related to the intensity of MNS as reported in other studies<sup>6,8,67,101,179,183,207,210,231</sup>. Acceptability of supplements was another factor that was significantly positively associated with the intensity of the use of both FS and MNS. The effects of acceptability that reflected participants' preferences in taste, smell, or texture have rarely been investigated<sup>184,231</sup>. The results of this study showed that increased acceptability and increased use of both supplements are closely related. Moreover, those who had greater acceptability of MN pills were more likely to consume the pills with high intensities both in early and late pregnancy

(‘high-high’ pattern) and use the MNs persistently.

The positive influences of CNP on FS was noteworthy, particularly in relation to the consistently significant associations between the ‘early’ group in FS and all utilization measures of FS and CS in the multivariable analysis. The roles of program deliverers in facilitating participation in food supplementation was apparent in the ‘early’ FS group where participants were actively encouraged to initiate the supplementation showed greater initiation and utilization even though most of other factors were not significantly different between the two food intervention groups (data not shown). This means that the persuasion efforts of program providers in the early stage of the program were also associated with later use of food packages as participants in the ‘early’ FS group showed significantly positive relationships with all persistency measures. The food supplementation in this study required active behaviors of participants that might have made them cope with conflicts with cultural boundaries. As a result, proper education or persuasion that were incorporated as a part of the program could have been effective to elicit desirable participation behaviors. These results may inform program planners about the design of future programs for pregnant women who live in a similar cultural settings.

Another noteworthy result was the significant positive relationship between women’s experiences of side-effects and duration and intensity of their use of FS, MNS, and CS. As discussed earlier, this likely indicates that participants who consumed Fs or MNs for a longer duration with a greater intensity were more likely to have experienced side-effects. Previous studies revealed that the associations of side-effects with uptake of nutrition supplements, particularly MNs, were less than anticipated<sup>11,20,37,70,231,240</sup>. Moreover, pregnant women who received education or counseling about side-effects tended to continue their supplement consumption by overcoming discomforts caused by side-effects<sup>98,101,210</sup>. Therefore, it can be

assumed that MINIMat participants persistently consumed both types of supplements regardless of the side-effects that they experienced and possibly ignored the side-effects because the benefits they experienced from the supplements outweighed discomfort from the side-effects. This finding is also meaningful considering that the total duration of supplementation of MINIMat was relatively longer than that of other studies that usually started food supplementation from the second or third trimester<sup>69,149,151,154</sup>.

#### 5.4.2.5 Health beliefs of participants

Health beliefs, particularly perceived susceptibility to illness of participants examined through their experiences of illnesses, health problems, or physical weaknesses, were significantly associated with increased utilization of MNS greater than that of FS. These perceptions were also associated with increased sharing and replacement of Fs. These results conform to previous findings on medical compliance and uptake of antenatal care, where appropriate treatments or recommendations that addressed participants' health threats or severity of health condition appeared to be important determinants of participation behaviors<sup>52,123,161,182,241-243</sup>. With regard to nutrition supplementation, similar results were also observed among participants of INCAP study where pregnant women who experienced greater illness episodes tended to consume more supplements<sup>152</sup> and among women who were anemic at the baseline and adhered to the treatments more than those with normal hemoglobin concentration<sup>34,244,245</sup>. Therefore, like a fear-mechanism technique suggested by Ojofeitimi et al (1983)<sup>96</sup>, addressing health-related issues participants were concerned about in relation to consumption of nutrition supplementation can be a good strategy to increase utilization of the supplement provided by a program.

Illness during pregnancy did not always lead to increased supplement use. In some

studies, pregnant women decreased their consumptions of iron tablets if anemia was not perceived as serious<sup>101,210</sup> or if they had diseases other than anemia<sup>162,237</sup>. Although it is prevalent in developing countries<sup>206</sup>, anemia among pregnant women is often considered to be a common symptom of pregnancy<sup>210</sup>. Moreover, in some cases, health providers did not regard the risks of anemia among pregnant women as serious<sup>26,34,101,210</sup>. Therefore, if symptoms of a health disorder are to be perceived as health threats or risks, proper efforts need to be made to help participants understand why they should be concerned about the signs and how these conditions can be improved by taking nutrition supplements<sup>231</sup>. Given these, the study by Ojofeitimi et al. (1982)<sup>96</sup> is notable because health fear along with nutrition counseling was employed to modify inappropriate food-related proscriptions among pregnant women and hence to improve maternal nutrition deficiencies in Nigeria.

#### 5.4.2.6 Attitudes toward supplements

The importance of positive perceptions toward taking nutrition supplements, particularly micronutrient pills, has been emphasized in many studies<sup>6,17,34,70,98,101,171,207,210,231,239,245</sup>. Likewise, participants with positive expectations and/or experienced benefits of the supplements were more likely to utilize the supplements persistently in this study.

Those who perceived positive effects of iron tablets were more likely to consume the MNs with a greater intensity, with a continuously high intensity throughout pregnancy, and as persistent users. Interestingly, the expected number of days until experiencing the effects of supplements was significantly positively associated with the intensity of MNS, which may imply that participants who thought that they needed to wait for a while until they would experience any effects of the supplements consumed the pills more patiently than those who expected to have the benefits quickly.

Similar to the findings of previous research, perceived benefits of the supplement in the current study were examined in terms of perceived health improvement<sup>17,70,98,171,207,208</sup> or perceived increases in strength<sup>98,171,208</sup>, appetite<sup>20,98,171,207,208</sup>, or weight. The associations of these perceived benefits with utilization of the supplements seem important because perceived effects of nutrition supplements among health providers<sup>25,34,101,180,210,245</sup> as well as participants<sup>17,26,34,98,101,162,210,231,245,246</sup> have played a critical role in improving supplement consumption in other studies.

In addition, inasmuch as many pregnant women in a region where the purposes of taking nutrition supplements were not known well may not perceive positive changes in their health conditions as benefits of supplement consumption, proper education and feedback need to be in place. It has been shown that education and counseling improved motivation to consume nutrition supplements by helping participants understand potential benefits they would obtain<sup>11,17,20,25,98,101,162,183,206,231,239,247</sup>. Moreover, experienced and thus perceived benefits could provide motives for pregnant women to overcome obstacles participants might face in taking supplements<sup>26,96,101,162,207,210</sup>.

To maximize the effectiveness of these educational efforts, including counseling and follow-ups, one more thing to consider is that program providers need to reinforce the importance and reassure women about the benefits of taking supplements repeatedly to sustain motivations of participants<sup>43,162,207</sup>. This being said, follow-up education or counseling based on participants' weight gains measured at antenatal care visits can be a good opportunity to deliver messages about progression of pregnancy in relation to their supplement consumption and its potential benefits. As discussed in Chapter 2, apart from the efforts need to be made by program providers in a nutrition supplementation program, positive effects of consumed supplements

participants experience needs to be linked with health changes of pregnant women for their more active and persistent participation behaviors toward nutrition supplementation.

#### 5.4.2.7 Social influences

Family members appeared to have significant relationships with initiation and utilization of nutrition supplementation in this study. Pregnant women living with their husbands' family members were more likely to initiate FS and CS. The positive influence of the husband on pregnant women's supplement consumption was significantly associated with a longer duration of CS and intensity of FS. These results are similar to the findings of the study about iron and folic acid usage among pregnant women in India, where family members encouraged women's tablet consumption but some women were dissuaded by their mothers-in-law<sup>98</sup>. In other studies, the primary role of family members was to remind pregnant women to take their supplements<sup>98,210</sup>. Inasmuch as social support has been reported as important in health behaviors of pregnant women<sup>68,83,98,136,210,246-248</sup>, eliciting more active roles from family members, particularly husbands and mothers-in-law, need to be considered by, for example, involving them in nutrition programs and making them knowledgeable about needs and potential benefits of nutrition supplement. This effort is eventually expected to contribute to sustain pregnant women's supplement consumption<sup>68,247,248</sup>.

In the present study, domestic violence was another factor that significantly affected utilization of the nutrition supplements: women who experienced violence during pregnancy tended to consume the supplement less persistently. Particularly, controlling behaviors of family members were significantly negatively associated with duration of MNS in the multivariable analysis. With regard to FS, various types of violence were significantly associated greater sharing behaviors. It has been demonstrated that pregnant women who experienced violence by

intimate partners are more susceptible to poor nutrition and hence tend to have undesirable birth outcomes<sup>249-252</sup>. Therefore, women exposed to violence in this study may have lost opportunities to improve their nutritional status by consuming the supplements less persistently than those who did not experience domestic violence, which could have exacerbated their poor nutritional status. Consequently, the relationship between domestic violence and participation behaviors provides useful information about effective targets for future nutrition supplementation. As a result, pregnant women with violence experiences have high potential to benefit from such interventions but may need additional encouragement to participate to access the benefits.

#### 5.4.2.8 Autonomy of pregnant women

Women's autonomy has been reported as an important factor to facilitate reproductive health behaviors, particularly antenatal care use<sup>39,46-48,71,84,146,177</sup>. These studies were largely conducted in South Asian countries where women's autonomy was known to be more restricted than other parts of the world. But few studies have examined the influence of pregnant women's autonomy on nutrition supplementation<sup>46,232,253</sup>.

The results of this study conducted in Bangladesh add valuable information to the relationships between pregnant women's autonomy and the utilization of nutrition supplementation. Particularly, the association of autonomy among pregnant women with their use of Fs is meaningful because previous studies<sup>46,232,253</sup> mainly focused on MNS. In addition, the association of autonomy with pregnant women's utilization of nutrition supplementation in this study was determined comprehensively by examining autonomy in terms of degree of mobility, control over household finance, and self-influences on decision-making, as suggested by previous researchers<sup>38,46,71,84,133,146</sup>.

It has been reported that women's participation in decision-making for health seeking

behaviors in South Asia was less than 50%<sup>132,177</sup> and reduced decision-making power was associated with low uptake of iron supplementation in Indonesia<sup>102,232</sup>. This limited contribution to decision-makings was worse when a woman was living with her in-laws, particularly mother-in-law, because married women are subordinate to their mothers-in-law according to the household hierarchy in this region<sup>38,132</sup>. Hence, it was not surprising that MINIMat participants who had a greater decision-making power maintained high intensities of Fs consumption throughout the pregnancy and appeared to be persistent FS users.

It is noteworthy that participants with greater control over household finances were more likely to initiate their FS and women's earned income was significantly positively associated with all persistency measures of FS except duration. This is comparable to the findings by Abdullahi et al.<sup>253</sup> in Sudan that showed women's employment increased antenatal folic acid consumption. Given that both women's employment and earned income have been found to enhance access to cash, purchasing power, and decision-making power<sup>46,48,134,177</sup>, it seems that the increased autonomy of women with earned income made it possible for them to consume the Fs more persistently than those who did not have any incomes. Significant positive associations of having a membership in a NGO microcredit program or other NGOs with initiation, duration, and intensity of FS can be interpreted in the same vein because women's participation in NGO activities, particularly those program pertaining to microcredit has been associated with greater economic power and hence greater autonomy of women in Bangladesh<sup>215,216</sup>.

In contrast, for MNS, none of autonomy-related factors was selected for the model explaining utilization behaviors. This is possible because the micronutrient pills were delivered regularly to each participants' homes, the consumption of MNs might have required less autonomy for women to be able to take the micronutrient pills than the food packages, which



required pregnant women to use their autonomy of overcoming various cultural norms.

The significant relationships between utilization of FS and women's autonomy, particularly women's control over financial resources, in this study can inform program planners that food supplementation provided with an intervention that increases women's autonomy through financial support, for example a microcredit program, would enhance utilization of FS among pregnant women in an area with similar cultural settings like this study.

#### 5.4.2.9 Factors affecting combined participation behaviors

Factors that were associated with combined participation behaviors deserve attention because the proportion of those who persistently used both types of supplementation was low. In general, based on the results of multivariable analysis, the factors that affected participation behaviors when the FS and the MNS were considered simultaneously were inclusive of those that affected FS or MNS individually. Demographic characteristics, program-related features, positive attitudes toward supplementation, and factors reflecting women's autonomy are remained significant in CS as well as in individual supplementation. Among these, higher education and uncomfortable feelings about receiving rations outside the household are of particular concerns because they were significantly negatively associated with all utilization measures of CS and hence need to be considered so as to improve participations in the future.

It is also noteworthy to emphasize factors significantly related to those who utilized both types of supplementation with a consistently high intensity throughout the pregnancy and became persistent users because they made the most use of the program and hence are possibly the benefited the most from the MINIMat. Those were participants who were older, less educated, assigned in the 'early' FS group, with comfortable feeling in receiving food rations, with positive experiences about both food and micronutrient supplements, and with earned

income. Therefore, persistent behaviors in the combined supplementation were explained largely by factors from domain of demographic characteristics, cultural features, program delivery, attitudes toward the effects of supplementation, and women's autonomy in this study.

In summary, each dimension of the theoretical model for this study (Figure 5-3) had some factors significantly associated with participation behaviors. FS. Among demographic factors, the relationships of education with utilization of supplementation were quite different from the relationships between maternal age and parity and participation behaviors. Strong culture-related perceptions and practices were negatively association with persistent use of supplements. Compared with factors in other dimensions, only a couple of factors representing economic status of the household had negative associations with some measures for utilization of FS. Good quality of program services, greater perception on susceptibility to illness, and positive perceptions and experiences on nutrition supplements showed positive associations with initiation and utilization of both FS and MNS. Family influences, in terms of support from family members or domestic violence, were associated with some participation behaviors. Finally, factors that reflected women's autonomy had significant positive associations with utilization of FS.

### ***5.4.3 Limitations***

The number of food packages participants consumed was determined from the monthly self-reports, which is likely less reliable and valid than other methods, such as direct observation or measurements of physiological markers, to estimate the consumption of assigned regimens or supplements in compliance research<sup>61,67</sup>. Self-report is also known to overestimate compliance or adherence<sup>20,54</sup>. Given that sharing and replacement were prevalent among the participants in this

study, the actual amount of food supplement consumed by MINIMat participants could be far less than the self-reported amount, which makes the estimation difficult. There is no gold standard for estimating supplement consumption, however, and self-reported compliance has been known to be closely related to estimation by other methods<sup>61</sup>. In addition, to validate these self-reports, the MINIMat study included monthly half-day food frequency questionnaires in which women were asked if they had consumed any food packages during the past three days. The correlation between the results of half-day food frequencies and monthly self-reports was 0.79. This high correlation suggests that it is reasonable to use self-reports to examine the relative level of participation behaviors in this study. Moreover, regardless of the weaknesses of using self-reports, it is apparent that the pregnant women in this study were less active in consuming food packages than in taking micronutrient pills, which, in itself, is meaningful to consider for future supplementation programs for pregnant women.

Another concern was that quite a few explanatory variables (almost 30% of the total), particularly those representing psychosocial domains, had missing values. Those women with missing values with psychosocial variables were more likely to enroll later in gestation, enroll during non-lean period of food availability, and be less educated (data not shown). In contrast, maternal age at enrollment, intervention groups of FS and MNS, economic status of the household estimated by possession of clothing, control over finance, and family composition of participants with missing values in psychosocial variables were not different from those of participants without missing data. To consider the effects of missing values in multivariable model selections, multiple imputations and full information maximum likelihood estimations were carried out for binary and continuous outcome variables, respectively. For the missing data about monthly supplement consumption, outcome variables, however, imputations were not

applied because of the following considerations: 1) the imputation needed to be done at multiple levels; 2) imputation of missing data based on available consumption values was not appropriate because of variation in consumption within a subject, particularly those who had more missing data; and 3) potential time-dependent variations in consumption data were expected, which together were too complicated to consider for various missing patterns.

Although MINIMat collected extensive and valuable information, it is also a limitation of this study that questionnaires were not designed from the outset to be used to infer some of the psychosocial dimensions of interest, including health beliefs on susceptibility, attitudes toward supplementation, social influences, and women's autonomy. Rather, it was necessary to select those questions likely to correspond to each dimension from multiple types of questionnaires. Cronbach's coefficient alpha was between 0.49 and 0.60 for psychosocial dimensions, which implies that the reliability among measures in each dimension was poor or questionable. Therefore, a composite variable for each dimension was not developed, instead, measures were used individually in the analysis. In this respect, each dimension in the model (Figure 5-3), that could have been estimated as a latent variable of these individual factors, was possibly represented in less reliable manners than using composite variables, which also limits generalizability of the results of this study to only the variables actually used in the analysis.

#### ***5.4.4 Strengths***

In this research, we had a unique opportunity to examine participation behaviors of pregnant women provided with two different supplements simultaneously in a single program. Inasmuch as the two supplements were quite different from each other in the features of provision and administration, this permitted us to develop an understanding of participants'

differential behaviors toward the two types of supplements and also to compare relationships between different behaviors and various characteristics of participants.

The longitudinal study design of MINIMat, which followed pregnant women from early pregnancy until delivery along with monthly collections of data on supplement consumption, made it possible to investigate a series of participation behaviors, including initiation, duration, intensity, pattern, and persistent consumption. This responds to previous studies<sup>20,98</sup> that called for research on different stages of behaviors in nutrition supplementation to understand participation more thoroughly like in studies on medical compliance<sup>52</sup>. It was particularly meaningful to examine initiation and utilization of supplementation separately because these were quite different behaviors that strategies to increase each type of participation were different as well. Accordingly, factors associated with initiation were those featured in the early stage of pregnancy, distinguishable from those in the later pregnancy.

Extensive data on various factors of participants collected longitudinally from about 1,300 questions during clinic and monthly home visits add information with which to interpret pregnant women's participation behaviors comprehensively. From these data, approximately 80 variables were selected through exhaustive processes for developing variables representing each of 8 domains of the theoretical model suggested from the qualitative study. This made it possible to compare and contrast the associations of these factors with participation behaviors from various viewpoints at the same time, another novel approach to delineate pregnant women's behaviors in nutrition supplementation programs. Moreover, the large number of participants of MINIMat that were sufficient to investigate all these associations should not be overlooked.

Finally, inasmuch as the current study was conducted in a rural area of Bangladesh, the results presented here are generalizable to other rural settings in similar countries in South Asia.

It is noteworthy that many findings were comparable to previous studies conducted in these countries.

#### ***5.4.5 Conclusions and implications***

Participation behaviors and their associations with various features of MINIMat participants provide valuable information to design a well-planned nutrition supplementation for pregnant women that would enhance participation as well. In MINIMat, there was greater initiation and utilization of MNS than FS and very low rate of persistent utilization of both types of supplementation, largely caused by low uptake of FS. This suggests that more efforts to improve participation in FS are required, along with a better delivery and administration system of FS that considers pregnant women's cultural perceptions and traveling distance to the distribution sites.

Pregnant women with more education and negative cultural perceptions about receiving food rations outside of the household have greater possibility to refuse or reduce consumption of Fs and hence need careful attention to motivate their participation. In contrast, helping participants perceive the benefits of supplements, involving family members as facilitators for women's uptake of supplements, and raising awareness about women's autonomy in taking supplements would improve participation of pregnant women in future food supplementation programs. Particularly, the roles of program providers in encouraging participations in FS need to be emphasized because of consistently highly significant associations of the 'early' food intervention group with FS and MNS as well as different participation measures.

Pregnant women with a younger age or a lower parity, who were less likely to utilize MNS persistently than those were older or had more pregnancy experiences, need more tailored

efforts for them to increase uptake of MNS, such as providing proper information about the benefits of taking MNs, securing the supply of MNs that have appropriate acceptability, and taking care of their concerns about delivery and health susceptibility.

Finally, participation in a nutrition supplementation program involves various behaviors of participants to consider. Initiation of supplementation needs to be regarded as a separate behavior from other utilization behaviors, particularly as an important first step for a successful participation in FS. It would be also important to understand the factors associated different utilization behaviors along with their relationships with the benefited the most to facilitate participations in a nutrition supplementation. When considering food and micronutrient supplement jointly, more efforts need to be made to facilitate persistent consumption of the food supplements than to increase micronutrient pill intake. This is because consumption of food packages involves cumbersome preparations and burdensome delivery mode, including women's traveling to a CNC. In addition, careful guidance and supervisions are to be in place to reduce sharing and replacement of Fs and hence to prevent these behaviors from undermining the benefits of Fs.

## **Chapter 6. Conclusions**

### **6.1 Purpose of the dissertation**

Cultural features associated with pregnancy and delivery in the context of a rural area of Bangladesh and pregnant women's experiences in nutrition supplementation programs were elucidated in this dissertation through a qualitative study. Subsequently, various participation behaviors of pregnant women and their relationships with potential factors examined in a quantitative study of data from the MINIMat study by applying a psychosocial model developed based on the results from the qualitative study to find ways to improve the effectiveness of nutrition intervention programs.

### **6.2 Unique features of the dissertation**

The unique setting of MINIMat that participants received both food and micronutrient supplements jointly provided novel opportunities to investigate differential participation behaviors toward the two types of supplementation and the effects of sequence of initiating the two supplementation. Moreover, the design of the study, a randomized controlled trial with a sufficient number of participants followed longitudinally and extensive data collections on both external and internal features of participants, made it possible to conduct a comprehensive examination of relationships between participation behaviors and potential factors associated with. Particularly, inasmuch participation behaviors can be viewed as a series of actions, initiation was examined separately from utilization, which was also examined in terms of duration, intensity, pattern and persistent consumption of food, micronutrient, and combined supplementation.

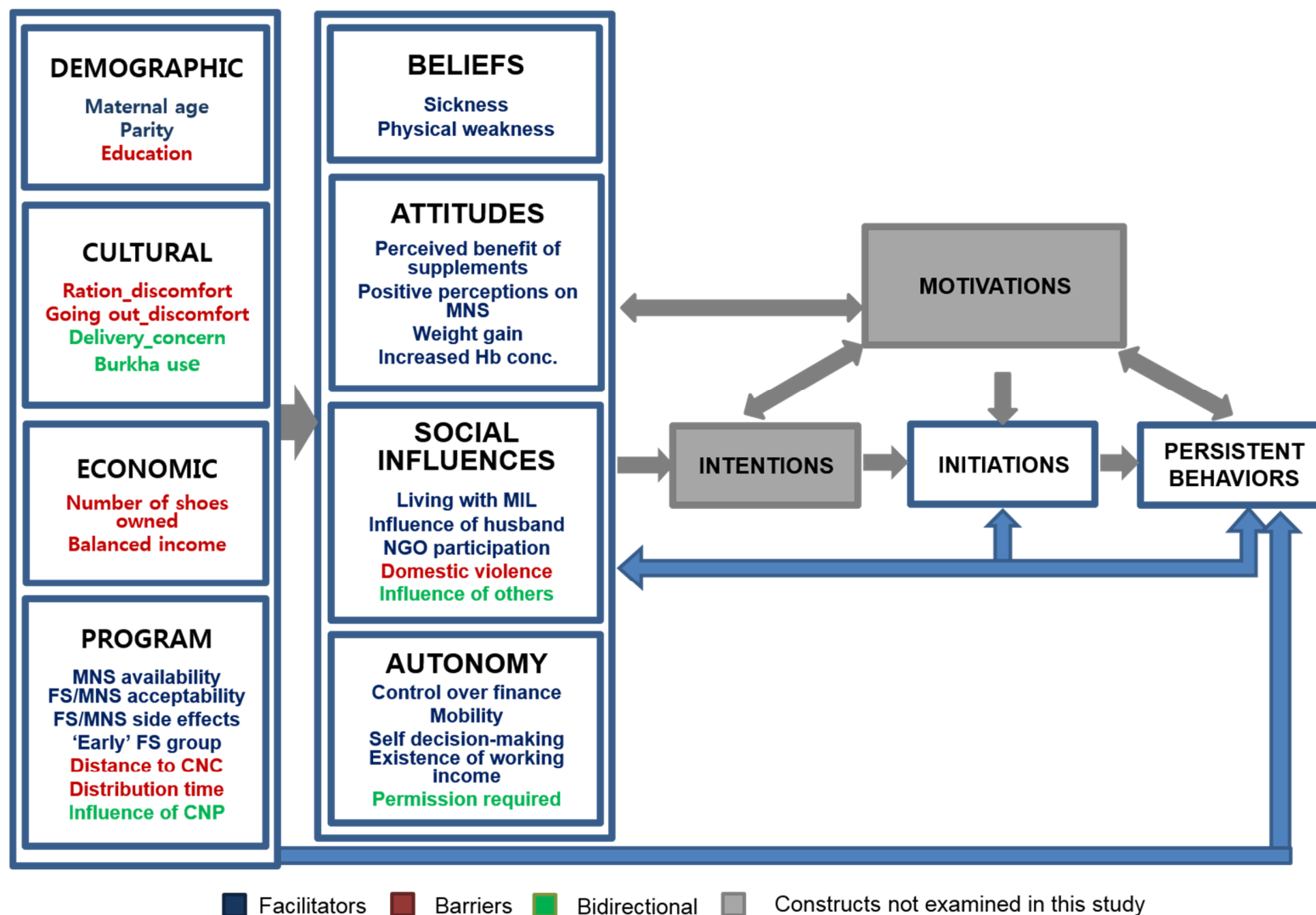


### **6.3 Mixed-method approach**

Through the mixed-method approach employed in this dissertation, findings from the qualitative research were used to provide insights for the quantitative study, suggested a theoretical model about pregnant women's participation behaviors. Inversely, results of the quantitative analysis added validity to the qualitative study <sup>113</sup> by showing that associations between many factors and participation behaviors from the two studies conformed to each other, which also provides triangulation to strengthen the findings of the qualitative analysis. In addition, the quantitative analysis complemented the qualitative study by allowing not only comparisons of factors according to the level of participation of pregnant women but also considerations the influences of multiple factors simultaneously. Finally, those results consistent in both studies showed that the 4-7 years of time gap in collecting data between the two studies was not a big concern to examine participation behaviors and associated factors.

### **6.4 Main results**

According to the qualitative study, specific socio-cultural contexts set boundaries of women's behaviors during pregnancy, particularly about their movements and dietary intakes, including supplement consumption. Fears for pregnancy-related risks, such as miscarriage, maternal death, and abnormal birth outcomes, were deeply associated with unique cultural beliefs and practices. Various concerns during pregnancy, particularly physical weaknesses of pregnant women, loss of appetite, financial burden of a cesarean delivery, and inadequate dietary intake due to poverty, emerged as potential factors that contributed to shaping women's attitudes toward nutrition supplementation. Mothers-in-law and husbands significantly influenced behaviors of pregnant women through their roles as gate keepers in program participation. Quite



FS: Food Supplementation, MNS: Micronutrient Supplementation, CNC: Community Nutrition Center, CNP: Community Nutrition Promoter, Hb: Hemoglobin, NGO: Non-Government Organization

[Figure 6-1] Factors affecting participation behaviors among MINIMat participants

a few women revealed that they shared the food supplements with others and substituted them for their usual meals. Health care providers, including medical professionals and community nutrition promoter (CNP), played important roles in promoting pregnant women's consumption of nutrition supplements. Pregnant women who understood potential benefits of taking supplements were active in participating in the supplementation, which in turn facilitated further participation based on benefits they actually experienced.

The results of quantitative analysis corroborated the findings of qualitative study (Figure 6-1). Culture-bound perceptions and practices negatively influenced utilization of FS<sup>10</sup>. Family members, particularly the husband or parent-in-law who appeared as gate-keepers as well as primary care-takers for pregnant women in the qualitative analysis, were positively associated with initiation and duration of FS, but, at the same time, negatively associated with the persistent use of FS. Pregnant women in the 'early' group of FS, where program providers' active exhortations for program participation occurred, participated more in all participation behaviors studied than those in the 'usual' group of FS. Perceived health susceptibility to illness and benefits experienced after taking the supplement were positively associated with greater utilization of both FS and MNS<sup>11</sup>. Pregnant women with greater autonomy in controlling household finances or making decisions were more likely to initiate and/or utilize FS than those with less autonomy. Overall, pregnant women's autonomy and perceptions and attitudes toward the supplementation accompanied with positive benefits experienced were important factors to consider. Roles of program providers in assuring participant's understanding and addressing their

---

<sup>10</sup> Means food supplementation

<sup>11</sup> Means micronutrient supplementation

pregnancy-related issues would facilitate better participation. Moreover, the considerable cultural and family influences on behaviors of pregnant women in the study area requires involving family members in a nutrition supplementation.

Regarding differential participation behaviors toward FS and MNS, pregnant women initiated more MNS than FS. On average, participants consumed micronutrient pills with a greater intensity for a longer duration than food packages. The proportion of women who maintained high intensities in consuming the supplements throughout their pregnancies or who persistently utilized the supplements were higher in MNS than in FS. Initiation and utilization of FS was a limiting factor when examining the two types of supplementation jointly: those who utilized FS with a greater level tended to utilize MNS with a comparable level, while the reverse was not true.

In addition, the extensive examination of participation behaviors suggested that initiation and utilization among MINIMat participants were clearly different two behaviors with different associated factors. Moreover, utilization behaviors, namely duration, intensity, pattern and persistency of consumption, of the two types of nutritional supplements offered to the pregnant women in MINIMat, reflected different aspects of program participation. Persistency in consuming the supplements represented those who utilized the most of the two types of supplementation. Participation behaviors were more thoroughly understood when all utilization measures were considered together than individually.

## **6.5 Future research**

The findings of this dissertation can be corroborated or expanded through further studies. An ethnographic study that illuminates perceptions and attitudes of actors other than pregnant

women, including husbands, mothers-in-law, and health professionals, toward nutrition supplementation would provide opportunities to understand sociocultural context pregnant women situated and its influence on supplement use from a multifaceted way. It would be also meaningful to interview those women who persistently consumed both types of supplements in spite of the existence of factors found to have negative associations with use of supplements in this study. By identifying certain features of intra-cultural diversity that enabled these participant to utilize the supplementation persistently, it will be possible to obtain important insights about strategies to improve participation of those who did not consume the supplements as the program intended. Behaviors and associated factors regarding sharing the food supplements with others and replacing home diet with the food supplements can be further examined through in-depth interviews and direct observations. Inasmuch as the interviewees of this study might have known that these two behaviors were not considered desirable in the program and possibly did not share their experiences fully, more interviews under environment that does not blame women about sharing and replacement would reveal important reasons and issues behind these behaviors.

Many psychosocial factors, found to be significantly associated with participation behaviors in this study, were developed from a set of questionnaires that were not planned to assess these internal factors. Therefore, to confirm the findings from this study, similar studies can be done with questionnaires that are designed to assess the important constructs of the theoretical model (Figure 5-3) in more valid and reliable manners.

Moreover, relationships among potential factors can be examined through more sophisticated analyses, for example structural equation modeling, to provide better pictures about associations between potential factors and participation behaviors. This comprehensive understanding is expected to provide future program planners with information about proximal

and distal factors related to participation behaviors of interest, which also can provide valuable guidelines to prioritize strategies to improve participation.

In addition, differential behaviors toward the two types of supplementation can be classified more elaborately and then examined through multinomial logistic regressions where different types of combined participation behaviors and their associations with potential factors can be analyzed simultaneously. Particularly, examining the characteristics of those who participated in the two types of supplementation differently, high in FS and low in MNS or low in FS and high in MNS, will provide different pieces of information to understand participation behaviors of pregnant women from the results of this study, which would suggest ways to improve participation specific to each type of supplementation.

Finally, inasmuch as many issues related to program delivery have been discussed in this study, program components, for example the type and size of food supplements, ways to distributing food supplements, and roles of family members in the program, can be modified in a small-scale efficacy trial with a proper evaluation study that includes both qualitative and quantitative approaches.

## **6.6 Conclusions and implications**

Considering the results from both qualitative and quantitative research, the following conclusions can be made along with implications for future nutrition supplementation.

### ***6.6.1 Importance of understanding cultural features that surround participants***

Understanding cultural background of participants is critical to improve effectiveness of a supplementation program. Pregnant women, particularly in a place like rural areas of Bangladesh

where culturally normative behaviors are expected and valued, can hardly be free from culture-specific beliefs and perceptions as well as their social context the women are situated. These sociocultural obligations did matter when those women were asked to adopt new behaviors culturally unfamiliar to them, including taking food and micronutrient supplements daily. Particularly, pregnant women in this region had perceptions that they could not eat much and many of them felt uncomfortable in receiving food rations outside of household. But they were asked to travel to community nutrition center (CNC) daily and consume a bulky food supplement 2-3 hours after their breakfast, which certainly adversely influenced initiation and utilization of FS. Moreover, although the MINIMat provided group nutrition educations, many women reported that they still practiced certain cultural proscriptions, including avoidance of eating fish, a good source of protein, during pregnancy, that could adversely influence nutrition status of pregnant women. These indicate the importance of designing and implementing a culturally competent program, which provides participant-oriented services based on the understanding about cultural backgrounds of participants. Therefore program providers need to acknowledge that their views may be different from those of participants and to learn participants' perspectives on pregnancy and other related issues to increase program participations and hence the effectiveness of the program as emphasized by many researchers<sup>43,68,81,83,113,164</sup>.

#### ***6.6.2 Information about potential to benefit in participation from demographic characteristics of participants***

Among MINIMat participants, those who were more educated were less likely to initiate FS or participate in FS persistently than women who were less educated. Pregnant women who were older or had a higher parity used the MNS more than those who were younger or had fewer children. These differences in behaviors indicate that the supplements provided through

MINIMat were used by the proper targets because women with less education, greater parity, or older age were economically worse off and, hence, needed the nutrition supplementation more than those without these characteristics. On the other hand, these features of participations suggest that, in the future interventions, to enhance participation, efforts should be made to provide message or other services tailored to the specific needs of those who potentially participate less than others. Finally, even though these demographic characteristics of participants cannot be modified, they provide valuable information to predict potential to benefit to future programs implemented in places with cultural and social attributes that are similar to this study.

### ***6.6.3 Program features for planning and implementing future programs***

A few lessons can be learned from the program features of MINIMat to improve future interventions. Distance to a CNC was a significant barrier to some women who lived far and hence found it difficult to visit the centers. Given the cultural practices that restricted pregnant women's mobility as well as dangerous or unpaved roads to CNC, which even disappeared during rainy season in the study area, the mode of delivery of FS in a future program, needs different approaches to increase accessibility particularly for participants who must travel to acquire the supplements.

In the study area, the perception of 'eating for two' among pregnant women was not common. Instead, women thought that they were not able to eat more during pregnancy because of their reduced appetite, the reduced size of their stomachs, or their discomfort after eating. The program required participants to finish their usual breakfast 2-3 hours before providing the food packages and subsequently asked them to consume a substantial amount of food supplements at



the CNC. As a result, the majority of women revealed that they either skipped breakfast or had light meals before or after they consumed the food packages. Moreover, many brought leftovers home, which were then mostly shared with family members because of food scarcity of the household. This indicates that acquiring supplements cannot be regarded as consuming them and there was a considerable gap between these two as previously discussed<sup>174</sup>. This also implies that effectiveness of a nutrition supplementation program can be more precisely evaluated when actual consumptions of the supplements are considered, for example, through direct observations. Above all, providing participant-centered services along with close monitoring should be in place to maximize benefits for participants by preventing undesirable participant behaviors, including sharing the supplements with others and replacing meals with the supplements. Given this, supplying a more nutritionally dense supplement that meets nutritional requirements with a lower volume of food may increase the effectiveness of a service both culturally and physically.

#### ***6.6.4 Active involvement of family members for more participation of pregnant women***

Involving family members in a supplementation program is another strategy to enhance pregnant women's participations. This is because family support is crucial to assure women's full participation in areas, such as Bangladesh, where husbands and mothers-in-law play gate keepers in making decisions for pregnant women's behaviors. Inasmuch as we learned in this study that family members with positive attitudes toward nutrition supplementation supported women's supplement consumptions, efforts should be made to help the family members understand the importance and benefits of taking nutrition supplements. Inasmuch as delivering a healthy baby is a pressing concern for a family, emphasizing mother's health during her pregnancy that would

affect the status of baby can be also an effective way to address significance of nutrition supplementation to both pregnant women and their family members. Consequently, based on their understanding of and expectations about supplements, family members could contribute to improving supplement consumption through their active roles in nutrition supplementation, including reminding pregnant women to take their micronutrient pills as revealed in this study.

#### ***6.6.5 Important roles of program providers to increase awareness about nutrition supplementation***

The roles of those who deliver supplementation programs, including health professionals and CNPs, need attention because they were influential in providing health-related information during pregnancy not only to participants but also to family members. This was also reflected in the findings of this study that women in the ‘early’ food group where active encouragement of CNPs took place had better initiation and utilization of the food supplements than those in ‘usual’ group. Therefore, based on the findings of this study, several roles of those who deliver programs could improve participation of pregnant women in a nutrition supplementation program. First of all, program deliverers need to understand the importance of supplementation thoroughly and be fully motivated to facilitate pregnant women’s participation. Inasmuch as misbehaviors of program delivers can significantly reduce the utilization of supplementation<sup>43,163</sup>, they need to acknowledge participants’ beliefs and perceptions and provide necessary information through proper communications and educations at the level of the participants. Among other roles of program providers, making an effort to encourage participants to initiate the supplementation is exceptionally important because approximately 10% of pregnant women did not initiate the FS in this study and, hence, did not have a chance to receive any benefits from the supplements. This being said, the program providers’ roles in ensuring

participants' understanding and improving their perceptions about supplementation are also important. In addition, program providers can address the pressing concerns of participants, including physical weakness, anemia, desire to have a healthy baby, consuming nutritious food, and reduced appetite, and make use of these concerns as opportunities to promote nutrition supplementation. Particularly, for those women to whom a cesarean delivery is likely, specially tailored messages that address their fears and practical needs are required to enhance their participation in a nutrition supplementation.

#### ***6.6.6 Important roles of participants as main decision-makers in participating in nutrition supplementation***

The roles of participants cannot be underestimated. Above all, a proper understanding about pregnancy has to come first. Particularly, pregnant women need to perceive that for a successful delivery, good care of their health and nutritional status during pregnancy are as important as those at the time of delivery<sup>161</sup>. Given this, emphasizing that pregnant women are the direct beneficiaries of nutrition supplements can be an effective strategy to motivate participations as shown by Prentice et al.<sup>254</sup> Efforts to ensure participants' understanding about the benefits of taking nutrition supplements are necessary because, in this study, many women did not have enough information about the effects of supplements and, hence, did not think that consuming the supplements was essential. This is particularly important because many women were ambivalent about food intake during pregnancy. They thought that they should increase their food consumption to have a healthy baby but, at the same time, they were reluctant to increase the amount of food they ate. Moreover, it was difficult to change the perceptions that increasing food intake would be unnecessary during pregnancy in Bangladesh<sup>163</sup>. Nevertheless, one of the possible strategies to promote pregnant women's positive perceptions about nutrition

supplements would be addressing their worries about delivery, poor contraction resulting from physical weaknesses and anemia, in relation to potential benefits of nutrition supplements as suggested previously<sup>96, 70, 98</sup>. Peer-sharing of pregnant women's positive experiences with nutrition supplements would also be helpful particularly when culturally sensitive issues are dealt with in relation to consuming nutrition supplements.

Another issue to consider is to the gaps between expectations about the supplements and benefits experienced. This is crucial because positive perceptions about nutrition supplements greatly influenced actual consumption of the supplements: pregnant women who had firm positive perceptions overcame barriers, including side-effects, and continued to take the supplements in this study<sup>233</sup> and others<sup>17, 25, 37, 101</sup>. Therefore, to promote positive perceptions, both group education and personal counseling need to be included not only in the early stage of the program but also on an on-going basis to assure that participants have an adequate understanding of the value to the supplements. In addition, this has to be done with regular monitoring and proper feedback to participants. It is very important to help pregnant women perceive their positive changes in terms of strength, appetite, weight gains, or hemoglobin concentrations of pregnant through proper and personalized messages to promote further active participations, which can be done through regular personal follow-ups by health professionals, including community health workers. At the same time, less-than-anticipated benefits also need to be appropriately addressed, particularly when these are associated with poor participation behaviors of pregnant women.

All these efforts to enhance participants' understanding of and positive perceptions about nutrition supplements will eventually help to facilitate pregnant women's active participation. As both qualitative and quantitative analyses revealed in this study, women's autonomous decision-

making power in consuming supplements can positively influence persistent use of food supplements. This is imperative in places like these rural areas of Bangladesh, where many women tend to have passive attitudes or fatalistic views on pregnancy and child birth. These undermines their motivation to try something for their fetuses, including consuming nutrition supplements. Therefore, it is necessary to convince participants that they can take actions actively for their own and babies' health and suggest participating in a nutrition supplementation as one solution. This is especially important because pregnant women's determined intentions to consume nutrition supplements can outweigh potential barriers, including many cultural and social restrictions.

In conclusion, taking food and micronutrient supplements was a new behavior for pregnant women in a rural area of Bangladesh, and possibly conflicted with their cultural practices. This involved significant behavior changes of participants. Therefore, it is important to acknowledge that it takes time for women to adopt new behaviors and efforts should be made to understand participants' concerns prior to implementing a program. For an effective community-based nutrition program, along with stable supply of nutrition supplements, continuous education to reinforce awareness of pregnant women and their family members accompanied with proper monitoring and feedback on their participation has to take place for a considerable periods. Efforts to enhancing pregnant women's autonomy also needs to be made to motivate participants' consumptions persistently.

## **APPENDIX**

### **1.1 Consent form for the interviews**

#### **CONSENT FORM**

##### **Purpose of the research**

My name is Jisung Woo. I am from Korea, but now I am a student at Cornell University in the United States. I am working with a researcher at ICDDR, B as well. I am interested in learning more about the experiences and views about pregnancy of women in different places. The experiences and views of women are very important to understand how a pregnant woman behaves or make decisions during her pregnancy, particularly behaviors for good and healthy outcome of both the mother and the baby. Therefore I hope my study will provide important information in order to plan and implement programs for pregnant women, which will address the practical needs and at the same time will be acceptable to program participants. If you agree to talk with me I would like to ask you about your own experiences and ideas concerning your recent pregnancy. I'm not a medical doctor and I can't give you advice. Actually I'm here to learn and listen.

During the interview, you will be asked questions about your thoughts and views on pregnancy itself and pregnancy related health issues. Your opinion concerning nutrition supplements use and your dietary eating practice during pregnancy will also be asked. You can stop talking with me at any point that you want or if I ask you about something you would rather not talk about you can just say so. I would like to talk about these with you in a place where you feel comfortable. It will take approximately two hours to finish our talk. Also if there is something that is not clear to me, I may come back and ask you more questions later. I don't speak Bangla, although I understand a little, so I will need the help of my friend, (name of the interpreter) to translate what you are saying to me and what I am saying to you.

##### **Possible Risks and Benefits**

You can decide whether you want to do the talk with me or not. It is completely voluntary. If you participate, there will be no direct benefit to you. However, your experiences and views will be useful for people who are engaged in programs for pregnant women to understand pregnant women's thought and their behavior better. Your participation or refusal to this study will not cause any further effects on you.

##### **Confidentiality**

I won't tell your name to anyone, so that your privacy will be completely respected. A pseudo-name will be given to you and used for further data presentation. Only I and the researcher from the ICDDR, B will have access to the list that links your name and your identification number but the list will be destroyed when the study is finished. Also I would like to record the interview so I can listen to it again later. It is very important for me to make sure I will understand what you will

tell me in detail and correctly. So it would be really helpful if I can tape record the talk we will have. I won't share what you tell me, except with my teacher back at Cornell. Even to my teacher, I won't tell her your name and will only use the pseudo-name. I will manage all materials related to our talk strictly. Interpreters will not know your name because I will not share your name with them either. They will not have access to any material after the study. During study period, they will have limited access to the material if it is necessary with my permission and supervision.

**Future use of information**

If I need to use the information collected from this study, I will only share data with pseudo-names or abstracted information. I will make sure all the sharing processes will not violate the maintenance of privacy and confidentiality of information identifying participants in any way.

**Principle of compensation**

You will be given a small practical gift as appreciation of your participation. If any transportation costs are incurred for you to come to the place where we will have the talk, I will make sure you will be reimbursed.

**Offer to answer questions**

Do you have any questions?

Do you agree to do a talk with me?

Do you agree to let me voice record this session for accuracy and completeness?

Please tell me if this time and place are good to talk?

If there are any problems we can agree on a place and time of your choice.

Thank you for your cooperation

**If the subject is unable to read and write use Investigator's statement**

I, the undersigned, have explained to the volunteer in a language she understands the procedures to be followed in the study and the risks and benefits involved.

---

Interviewer's signature

---

Date

If you agree to participate in my study, please indicate that by putting your signature or your left thumb impression at the specified space below

\_\_\_\_\_  
Signature or left thumb impression of subject  
(Participation)

\_\_\_\_\_  
Date

If you agree to record the voice during the talk, please indicate that by putting your signature or your left thumb impression at the specified space below

\_\_\_\_\_  
Signature or left thumb impression of subject  
(Voice Recording)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature or left thumb impression of the witness

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of the PI or his/her representative

\_\_\_\_\_  
Date

**If you have questions: The researchers conducting this study are Jisung Woo, Prof. Kathleen Rasmussen and Dr. Ruchira Naved. If you have questions later, you may contact Jisung Woo at [jw557@cornell.edu](mailto:jw557@cornell.edu) or at 1-607-255-7547. You can reach Prof. Rasmussen at [kmr5@cornell.edu](mailto:kmr5@cornell.edu)/1-607-255-2290 or Dr. Ruchira Naved at [ruchira@icddr.org](mailto:ruchira@icddr.org). If you have any questions or concerns regarding your rights as a participant in this study, you may contact the Ethical Review Committee at ICDDR, B at 2-886-0523~32 or Cornell Institutional Review Board (IRB) at 1-607-255-5138 or access their website at <http://www.irb.cornell.edu>. You may also report your concerns or complaints anonymously through [Ethicspoint](#) or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.**



## Performance Agreement and Release

1. I, \_\_\_\_\_, have been informed and understand that Jisung Woo from Cornell University is audio-taping the interview in which my voice will be included.

2. I hereby grant the researchers of this study and their organizations, Cornell University and ICDDR, B. the right to make, use and publish in whole or in part any recorded footage in which my voice will be included in MP3 file format. Cornell University shall have complete ownership of the Recordings in which I or my contribution appears.

3. I also grant Cornell University the right to distribute, display, and broadcast the recording as part of its summary statistics or finished papers.

4. I hereby waive any and all right that I may have to approve the finished product or printed matter that may be used in connection therewith.

5. I expressly release Cornell University and all persons acting under its permission or authority fro any claim or liability arising out of or in any way connected with the above uses and representations including any and all claims for defamation or copyright infringement.

I am over the age of eighteen, and have read the above release, and fully understand its contents.

\_\_\_\_\_  
Signature or left thumb impression of subject  
(Voice Recording)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature or left thumb impression of the witness

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of the PI or his/her representative

\_\_\_\_\_  
Date

## 1.2 Interview guide used for interviews

### Interview Guide

1. I would like to start by asking you about this pregnancy. When do you expect your baby to be born?
  - Where do you plan to give birth, at your home or at hospital?
2. Do you have any other children?
3. How many children do you have? How old are they?
4. While you are pregnant, are there any concerns you have regarding your pregnancy, your child in the womb, or yourself?
  - What are they?
  - (For each thing) Why do you worry about it? What do you do for it?
5. While you are pregnant, are there any special things you do for better pregnancy or pregnancy outcome?
  - What are they?
  - What is the reason you are doing it?
6. Do you feel any worry about giving birth?
  - What are they?
  - What is the reason you worry about it?
  - What have you done for it?
7. Do anyone else in your family or here in the community make recommendations to you about what you should and should not do while you are pregnant?
  - Who have made those recommendations and what have they told you?
  - (For each thing) What do you think the reason they have told you to do them?
8. Have you received recommendations from the *pushthi apa* (the community nutrition promoter), or the CHRW (community health research worker) or *dai/dhoruni* (either traditional or skilled birth attendant) or any other *shasthyakormi* (health worker) or doctor?
  - What have they told you?
  - What do you think the reason they have told you to do them?
9. Those recommendations that you have received from the *pushthi apa* (the community nutrition promoter), or the CHRW (community health research worker) or *dai/dhoruni* (either traditional or skilled birth attendant) or any other *shasthyakormi* (health worker) or doctor and the kind of advice you have had from older people in the community, what are the differences between them?
  - What is your opinion about differences of the recommendations?
  - How do you deal with these differences?
  - Usually whose recommendation did you follow more than the other and why?
  - Whose recommendation did you feel more comfortable to follow than the other and why?
10. You've already mentioned some things about eating during pregnancy, but I would like to

ask you more about this topic.

11. During your pregnancy, how many meals do you consume per day?
  - How many times do you eat other foods between meals?
  - Is it more often or less often than before you become pregnant?
  - What is the reason you ate less or more foods during your pregnancy?
12. Would you please tell me what you ate between the times after you woke up and until you went to bed last night?
  - Were the meals you ate yesterday similar to other days?
  - If not, what is the reason you ate different meals yesterday?
  - How were the yesterday's meals different from the usual meals?
  - Usually what would be your usual diet? What do you usually consume your foods from morning till night?

(If the woman mention food supplement package, ask Q.16~31 first, then ask Q.13~15)
13. During pregnancy some women eating more or less. What do you do?
  - Do you eat more or less and why do you do that?
14. Do you eat any foods you usually don't eat when you are not pregnant? What are they? Why do you start eating these foods?
15. What about foods that you avoid eating? Why is that?
16. Have you taken any special vitamins, pills or special preparations of food that you are taking during your pregnancy? What were they?
17. I would like to ask about the food supplement package.
  - Where do you obtain the food package?
  - Is it easy or difficult to obtain it?
  - If it is difficult, what makes you difficult for going there and getting the packages regularly?
  - How about the timing of consuming the Nutrition (food supplements)? Do you have any problem with those who come to take the Nutrition? What about the distance to the centre from your home?
  - Do you have any permission to go along outside your house? If you don't go out alone, who accompany you? Do you have any problem with managing the household work to go to the Nutrition Centre? If it happens, how can you deal with this?
  - How do you get the package if you cannot go there? Is there any other ways you could obtain it? What are they?
18. Who usually accompany you when you go out to obtain the food package? Why? What does the company do while you are consuming the package at the centre? Have you ever given the person your Nutrition?
19. What is your family members' thoughts or attitudes towards the nutrition program?
  - Are they supportive or not? If they are supportive, what would be the reason?
  - If they are not supportive, how can you deal with them?
20. Would you please show me the package you are receiving or you received?
  - What is your opinion about taste, colour, smell and flour like appearance of the foods in the package? What is the reason to prefer or not prefer?

(Ask following questions in relation to the yesterday's meals)

21. When you take your Nutrition, when did you eat that package?
  - In the morning, before eating the package, what do you usually eat?
  - When you eat this, (probe it), do you have any problem to get your full breakfast before eating the Nutrition? Or do you willingly not get more of your foods to take the Nutrition?
  - How was it for you to consume your full breakfast before going to the center, difficult or fine?
  - What made you difficult to have the full breakfast before going to the centre?
  - When you cannot finish the Nutrition at the center, what do you do with the left-over?
22. When you consume the package outside the center or at home, where do you usually eat it?
  - When you eat the package at home, is it possible to finish the full package? Don't you have to share this Nutrition with others? With whom do you eat the Nutrition? If still not finish it, do you throw it or do you use it as foods of hens or geese? Or do you do anything with this? Why?
23. After eating the Nutrition, do you eat more or less foods than before?
  - How much more or less do you eat your meals?
  - What is the reason that you eat more or less foods when you consume the Nutrition?
24. What are the family members' attitudes toward the Nutrition?
  - Do your family members tell you what to do with the Nutrition?
  - Who tell these?
  - Who influenced your Nutrition consumption the most?
  - Why do they support or not support for you to take it?
  - If your family members do not want you to eat the package, what do you do with it?
25. Do you think the Nutrition consumption is helpful to you and your baby?
26. Do you take any medicines/vitamins during your pregnancy?
  - (For each kind of pills) Would you please tell me what you are taking? Would you please show me the packages of pills/medicines?
  - (For each kind of pills) What do you think about the shape, color, size, smell, and taste of the pills?
  - Do you feel difficult or easy (convenient or inconvenient) to take these pills or medicines?
  - What is the reason you feel like these?
  - If there is any difficulty, how can you continue to take these medicines?
27. During pregnancy, have you ever taken any other pills before? Where and how did you get them? Can you remember when and how often you took the pills?
  - How did you feel about taking pills (difficult/easy, uncomfortable/comfortable, or convenient/inconvenient)? What was the reason you felt like these?
  - What would be the difference of the pills between now and then?
  - Which one is better for you to take? why?
  - How could you continue to take the pills in spite of these difficulties?
28. Are your family members supportive for you to take the pills?

- What do they tell you about taking pills?
  - Why do they support or not support about your taking pills?
  - If they do not support taking pills, how do they deal with it or react to it?
  - How do their opinions affect you to take the pills? Why?
  - How can you continue to take the pills in spite of these influences?
29. What about the reaction of your community members, supportive or not supportive?
- What would be the reason of your community member's responses toward pill taking?
  - If they do not support taking pills, how do you deal with it or react to it?
  - How do the community's reaction affect you to take the pills? Why?
  - How can you continue to take the pills in spite of the community's influences?
- (Only ask to woman who had pervious experience of pill taking)
30. What would be the difference of the family members' reaction about taking pills between now and then?
- If there have been any differences, what do you think have made these differences?
  - How did these changes in family members' attitude affect you to take the pills?
- (Only ask to woman who had pervious experience of pill taking)
31. What would be the difference of the community members' reaction about taking pills between now and then?
- If there have been any differences, what do you think have made these differences?
  - How did these changes in community's reaction toward pills affect you to take the pills?
32. In general, how would people think about taking pills both during pregnancy and during normal time, positive or negative? Why do people think like that?
- What kind of effect do you think the pills have for you and/or for your baby? What is the reason you take the pills?
33. Have you bought any other nutrition supplements? What are they?
- Where and how have you obtained them? Why did you buy these supplements?
34. (Only ask woman who consumed different types of supplements)
- You already mentioned that you took more than one type of supplement. What was the difference between them? What is the reason?
  - Was one easier (or convenient or comfortable) to take than another? What was the reason?
35. Was one better for you than another? What would be the reason?
- (Ask this question, if the informant did not mention any specific family members for their influences from previous questions)
36. Among your family members, who have the most influenced your decisions for foods, activities, and other matters related to your pregnancy?
- What is your husband's role or influence during your pregnancy?
- (Ask this question, if the informant did not answer in detail about her strategy to deal with the conflicted information about supplement use from previous questions)
37. Finally, I would like to ask you is it ever a problem to know what to do when advice from different people are not the same?

- If so, what do you think women should do if this happens? Why do you think like that?
- If this happened to you, what was it?
- How did you deal with this issue when it happened to you?
- What was the reason you reacted like that?

Thank you so much for talking with me today.

## 2. Pregnant women's responses according to emerged themes

### 2.1. Fears

#### 2.1.1 Maternal death

Sometimes I feel fear of dying, if I die at the time of delivery (35). Aren't there many babies who after birth have sickness? Again mother may have problem also, at times mother also die. Can't there many problems? (10). Sometimes I feel fear of dying, if I die at the time of delivery.(27) The time of delivery appears as the most troublesome time to me (17) My Ja she delivered a baby then immediately after birth the Placenta did not detach. Doesn't detach.....after that while she was being carried to Khadargaon on the way she had died. (11) Bad means baby doesn't pass out. Mother dies.(24) The fetus came first with his hand and legs and got hurt in his brain, then what would be. I was anxious with this. Anything danger may happen. Again, if the delivery does not happen, something bad may happen to mother Convulsion may happen to mother and die (25). Yes, she was anemic, there was a lot of bleeding during the birth process, even after transfusion she did not make up and died (6). The fetus came first with his hand and legs and got hurt in his brain, then what would be. I was anxious with this. Anything danger may happen. Again, if the delivery does not happen, something bad may happen to mother Convulsion may happen to mother and die (25)

##### 2.1.1.1 Physical weakness

[Physical weakness was worried by women] I don't get strength to do any work (26) I had strength before, but now I have not.(36) I feel weak, and suffering from low pressure and also suffering from anemia.(40) I don't feel energy at all. At least, I felt energy previously, now a day I don't feel that energy.(4) Now my body has become weaker than before.....have aged. (11) I am weak and have a low blood pressure. I am very weak. I felt it every time in my daily life. (35) Sometimes I went alone. Sometimes I took my mother-in-law with me because on that time, I was weak.(1) They said me, "you will have to eat frequently, and it will help you to remain healthy." If I hadn't taken medicine I felt vomit. I felt weak. (38) After menstruation ceased to occur, I had waited for three months and I was feeling weak, I had bought a urine tester and confirmed my pregnancy. (40) They said me, "you will have to eat frequently, and it will help you to remain healthy." If I hadn't taken medicine I felt vomit. I felt weak.(5)

[If a mother is healthy, the baby will be healthy, too] For getting strength and getting energy. They said from hospital that if you take more food, your fetus will be healthy and you will get energy. When you will deliver your baby you will be weak. If you do not eat, where your baby will get food? (9) If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it. (11) At Hospital the card that has been given to us in that it has been written "pregnant mothers should take food correctly, baby will be physically weak if food is not taken correctly. Food has to be taken correctly, fruit has to be eaten, has to eat good food." (15) If I do heavy work, child can be weak and it can problem also (1). After 8 days. Within these 8 days his body became so weak. His body had no strength, it became loose. He didn't make any sound even (4). After birth, baby had weak physique and was in hospital for many days. After that it came in mind the baby was not fulsome, baby born was weak, where went the Pushthi? What says, went to hospital, was afraid, baby is physically weak, baby cannot eat properly, so he said to do the way they say (15). If Pushthi was not eaten then probably baby born would have been weak, or there is no vitamin, nothing happened. There would have been a lot of problem. I ate Pushthi, benefited the baby (17). My first child is very weak. He was 3.5 kgs in weight. But he felt a bad scolding in his hand and leg. He faced Jaundice and pneumonia. Except of this he did not get breath after delivery. After ten minutes of delivery he started his breathing (25).

[Causes and consequences of physical weakness] Now my body has become weaker than before have aged. Weaker than before. Have aged. For this this problem have surfaced. Previously such problem didn't appear, physique was good, was healthy (11). Hmm. Day by day, I am being weaker, ain't I? The feelings during my first pregnancy have been gradually changed in comparison with third and fourth pregnancy; now, ain't I weaker than before? A. Day by day I am getting older./ Health condition doesn't remain the same. During my first pregnancy my health condition was different. During my 4<sup>th</sup> I have become weaker gradually, haven't I?(38) If rest is taken may be own body remains tired say worked for six hours, after that may be mother feels weak, after that if rest is taken then com fort for mother comfort for baby, or else pressure may fall on baby (14). No, no, there is edema there is weakness in the body less vitamin for that there is edema (17). Eat else you will be weaker, cannot do , cannot move", my mother in law tells like these. (15) I ate less, I felt headache and weak (18). That we do not take medicine properly for this we do not have breath, get exhausted slightly, other's Bou (wife of son) are strong enough, we do not take

medicine properly (18). No problem arises in going anywhere, in this condition going to some where is ad, don't feel bad. Physically feel weak or while walking it feels that there is contraction in the hand and leg (17). It is seen that in the noon time if you go in the sunlight physically felt bad or feel weak or if on walking or if walk or more of that or talking or will feel bad that's all (17). Went to Hospital. there I was for 3/4 days. Pain was in the waist. This leg waist think could not get out of house, took me holding. All of a sudden/abruptly pain in the waist, so went to Khadargaon. From Khadargaon referred to Matlab. After going there gave injection then pain reduced a little. They said for weakness of health. Baby weak, weak physique (15). If I will die. I am so weak. So, I felt tensed. I am very weak. I felt it every time in my daily life. My body trembled and I felt dizzy when I tried to stand from sitting. What can I do? We don't have money. I have to eat nutritious food, but how could I manage money? This type of tension does not exist much. But I have a danger time facing me, so always feel some tension. At the time of my delivery (35). Eat else you will be weaker, cannot do, cannot move", my mother in law tells like these. (15) Physically feel weak or while walking it feels that there is contraction in the hand and leg. What measure should I take to remove Afa? Poor person now there is nothing that-----nothing is there that now that will go to Lady Doctor after that bring beneficial medicine or there is no such money to buy this or that for eating (17).

[Anemia, blood pressure and physical weakness] Blood test was performed, it was group test, blood pressure was measured and it was only 60 mercury. Due to this, I feel tired. I feel weak, and suffering from low pressure and also suffering from anemia (40). They told me that I have no pressure. I am weak and have a low blood pressure (35). Weak, in body pressure is, by measuring pressure they understand low pressure (8). Physical tiredness, weakness, all these are manifested during pregnancy, when those symptoms are observed the mother is advised for hospitalization (6). It may have problem with baby, feel weakness, mother may die (26). If I will die... I am so weak. So, I felt tensed (35).

[Women's strategies to be strong] Who eats a lot her baby will be strong and healthy. Mother will be well and the baby will be good in health. If eats good food (26). If I ate much than I will be strong and that is better for both- me and my fetus (36). Eating more food will give strength to my body. Will have energy, blood will form (40). They said me, "you will have to eat frequently, and it will help you to remain healthy." (38) For getting strength and getting energy. They said from hospital that if you take more food, your fetus will be healthy and you will get energy (9). No, there is nobody here to follow the rule. Mother will be strong, mother will not be weak, baby will be good and strong by eating more (27). they said me, "you will have to eat frequently, and it will help you to remain healthy." Health condition doesn't remain the same. During my first pregnancy my health condition was different. During my 4<sup>th</sup> I have become weaker gradually, haven't I? (5) If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it (11). If didn't eat then became weaker (12). Now my mother in law tells, if not eat or if not do anything says "eat else you will be weaker, cannot do, cannot move", my mother in law tells like these (15). Now this has come in the womb, then it was seen that for many days could not eat, or vomited for many days or was physically for many days, weakness was there (17). They suggested as because I am weak and suggested to eat more and told about the delivery that it could be better to do it in Hospital (35). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave that tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my delivery will be safe and my fetus will be intelligent (25). Mother-in-law told that it is better for health. They served it at your house. It helps you to be strong. It is better to eat Pushthi and it helped baby to be strong. Those who got it, is much strong then the others (36). Taking for weak physique gave from here. If this is taken then the body will not be weak and feel hungry that's why you are taking? (15). Good that weak in physique, then anemia, otherwise also baby is in the womb. Before birth of the child. Earlier also thought that sick, weak, will have little energy after eating these (19). One day she told me. I asked her "apa (sister), what does it happen if I take it?" she told that it clean(dirt free)his/her bloods whose health is weak (2). This they administered Pushiti for weakness. They say that they give. It is given since you do not have blood in your body or giving for weakness of body (17). By taking vitamin tablets, mother doesn't become weak. Mother remains healthy (24). If I physically feel weak then they give Vitamin that red tablet. Take that I am weak, physique is weak. Take because of weakness (8). They tell think if this(supplement pill) taken then physique will not be weak and will feel hungry (15). That we do not take medicine properly for this we do not have breath, get exhausted slightly, other's *Bou (wife of son)* are strong enough, we do not take medicine properly (18). Physical tiredness, weakness, all these are manifested during pregnancy, when those symptoms are observed the mother is advised for hospitalization. if one is weak, frail, body ache then required medicine will be procured by patient themselves (40).

### 2.1.1.2 Bleeding and anemia

[Benefits of clean blood and production of blood] It will give strength to my body. Will have energy, blood will form. Fetus will remain healthy, it will be healthy if the mother is healthy. Baby will be also healthy (6). Physically get a little strength that's it. Produces blood. Produces in body. It is said that if it is taken it produces blood in the body, then strengthens that's it (12). That it has Vitamin it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken (11). Says blood is purified. Baby will be good will be good for body. Said it will benefit if eaten, eating for that (13). Nutritious food makes blood. Anemia goes away (25). I knew that it was good for me and also for my fetus. It created blood (27). Do not many people blood is impure? Many people have problem in their blood (2)



[Expected effect of iron supplement] Eating vegetable due to its importance. It is required for production of blood. I is that iron tablet will produce blood, Calcium and energy. Iron will produce Blood (6). Take. What is the problem? Blood remains clear if it is taken as said. That's it. So that blood remains perfect. Red. That is heard, people say that good if taken. Say people from neighbors. They just give, they say pregnant woman to take. Take there I hear from people that it is good if taken as said, blood remain clear, that's it. Blood remain good, that's all (8). Physically get a little strength that's it. Produces blood. Produces in body. It is said that if it is taken it produces blood in the body, then strengthens that's it (12). Perceived good. In case of taking Iron considered good. Will be good for baby, there will be blood in the body. Vitamin will be in body. (12). That it has Vitamin it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. I do not remember. They said, doctors said those who prescribe they said. Don't remember. Take for that and we poor cannot arrange anything. If others deliver baby eat a lot of things, may be it helps develop brain of the child (11). Says blood is purified. Baby will be good will be good for body. Said it will benefit if eaten, eating for that (13). They say that they give. It is given since you do not have blood in your body or giving for weakness of body. Then you why don't eat? Must eat? The way they dictate behave like that. That they say good not bad. As-now doctor has come, said you come to hospital, baby born there, get delivered there. Now does anyone give wicked advice no everybody gives good advice (17). And also created blood for my body. But I forgot to take it daily. I often took it a day but forgot to take the next day (20). Nutritious food makes blood. Anemia goes away (25). Eating iron tablet Doctors say that if we eat iron tablet it increases blood. It helps to open. Easy delivery. it is good for health, it keeps blood clear, it protects many disease. My neighbors said. It is good to eat iron tablet (26). I knew that it was good for me and also for my fetus. It created blood (27). Yes. One day she told me. I asked her "apa(sister), what does it happen if I take it?" she told that it clean(dirt free)his/her bloods whose health is weak (2). They see that one. This is because it reduces blood deficiency, so don't say anything. For Iron, the doctor madams came to our house and said that I reduces blood deficiency, so they say that Iron has no problem (13). No they think good. if I forget to take they bring and give-good medicine take it. The think that our daughter is sick she will come round if it is taken. Good that weak in physique, then anemia, otherwise also baby is in the womb (19). They (family members) always took it positively. They (neighbors) also seemed better. Because doctors have given this. This is for anemia (25). Why they consider it good! My parent in laws are saying that their daughter in law (me) will remain in good health, my baby will also remain good, there will be no problem. So that we remain good in their family(7). In case of taking Iron considered good. Will be good for baby, there will be blood in the body. Vitamin will be in body. Husband also felt the same that if eaten there will be blood in the body (12). Yes that will help to reduce bleeding (27).

[Blood pressure was routinely checked] Blood test was performed, it was group test, blood pressure was measured and it was only 60 mercury (6). Someone who suffers from prolonged pain are taken to hospital. Blood pressure is measured, or administer required medicine of blood pressure, feed right, or advise to take a little rest, they say all these but do not give any thing (medication) for intensifying pain (6). Here, came once on last Saturday, they took my blood sample and checked my blood pressure. Report has not been given till now (7). I felt pain in the left side. I went there and they diagnosed my urine, blood. They advised me to come again after one week (36).

[Iron supplement and blood pressure problems] Yes. She. again called me over phone, you have problem with blood pressure, you will have to go. So I am coming here, after that they said you must get admitted. Ok, I will get admitted, I am staying since then. My problem, water was less. Baby used to move little but now I see that it moves a little, I also get to feel that. (7) Weak, in body pressure is, by measuring pressure they understand Low pressure. This they understand that's it, give this, so take. (8) I had pressure (meaning hypertension). Then I went to new hospital, but they did not do this, and they sent me to Chandpur. The baby was born by Cesarean. Twenty five days over because of hypertension. They kept me two to three days and tried. They tried normal process but they couldn't (2). Mother-in-law prohibited me to go. I could fall down. I had some pressure (meaning hypertension). If I fell down, damage of child (meaning miscarriage) could happen (2). I feel weak, and suffering from low pressure and also suffering from anemia. Blood test was performed, it was group test, blood pressure was measured and it was only 60 mercury. I went to the hospital, they had advised to take more food because "you have low pressure" (6). I have taken those. I went to hospital once as I was afflicted with fever. So it was fever quite high fever, then they discovered through urine testing that I have low pressure. I was given medicine for recovering. What is the tablet, forgot its name. Iron tablet was prescribed say three months ago (7). They told me that I have no pressure. I am weak and have a low blood pressure. They suggested as because I am weak and suggested to eat more and told about the delivery that it could be better to do it in Hospital (35). When I went to the hospital, they also said I had problem in my urine and in my kidney. They said these things. They gave me medicine. It was a little bit less for few days but again it happened as earlier. They said that it occurred for hypertension (9) CRL gives, are giving. As I said before gave when I had low blood pressure. Forgot the name, that's it. Why they consider it good! My parent in laws are saying that their daughter in law (me) will remain in good health, my baby will also remain good, there will be no problem. So that we remain good in their family. So that there is no problem. They do not come under any pressure. What I say, which may bring betterment. They will remain good, their children will remain good, they are giving, they do not give for any bodies bad, since beneficial they are giving I am also taking (7). I take that weak, body pressure is, by measuring pressure they understand Low pressure. This they understand that's it, give this, so take. Pressure will remain all right (8).

[Consequences of bleeding] The baby will die, may be blood will start passing, detriment will happen (11). Remain healthy that is to say bleeding takes place on birth of a baby, in the village they do hold something, say about delivering a baby without a

midwife. Have to go to hospital. At hospital less blood passes. When delivered in the village house, tears may occur. On delivery at village house the midwife is there. Nail scratch from midwives causes tear, Blood passes profusely (8). If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work (38). Say, if you go out in the evening then both the baby and you may be harmed, pregnant woman may bleed (8). Suppose, bleeding can be happened (miscarriage) (36). If you are influenced by the wind, you can be dropping (meaning bleeding) or abortion can happen (38). I went to the pond for my bath. I just kept my clothes and went to another place to bring my cow. As soon as I took the cow to my house, I saw my bleeding started. And I felt headache. Maybe the wind of Alga touched me so that happened. The child was out (miscarriage). I did not see anything (any problem). After this I did not see any blood (bleeding). I did not see anything. After the baby out me saw blood 2-3 days (bleeding continues 2/3 days) (41). Because heavy work will cause harm to Uterus. If you have more babies, the uterus enlarges, the wall becomes thinner, and it may rupture on applying pressure. One may bleed at the uterus infrequently, one was taken to hospital for treatment and it was discovered that the uterus had ruptured. The fetus was in the womb, it was a premature case of delivery (40). My sister in law died during the process of delivery. She was anemic and before blood was transfused she had succumbed to Anemia. She was anemic, there was a lot of bleeding during the birth process, even after transfusion she did not make up and died (6). What problem? Weakness, death due to anemia etc. I feel weak, and suffering from low pressure and also suffering from anemia. I feel tired, my sister in law died during the process of delivery. She was anemic and before blood was transfused she had succumbed to Anemia. she was anemic, there was a lot of bleeding during the birth process, even after transfusion she did not make up and died. (40). Yes, mother also may die; again it may cause profuse bleeding (8). it is bleeding profusely, then a mother may have eclampsia. Ha.....dies (11). Then the sufferings I had, I couldn't even sit, the bleeding was massive and my hand and feet became ice cold, I couldn't even stand straight (16).

[Remedy for anemia] Anemic condition is removed with Iron tablet. Eat for this reason. Good that weak in physique, then anemia, otherwise also baby is in the womb (19). Since I am anemic, take food that much as it is ordained in my luck (6). Nutritious food makes blood. Anemia goes away. Because doctors have given this. This is for anemia (25). About iron tablet? It was for meeting Iron deficiency or for energy (6). So it was fever quite high fever, then they discovered through urine testing that I have low pressure. I was given medicine. What is the tablet, forgot its name. For recovering. Iron tablet was prescribed say three months ago. I used to buy from private doctor, they used to give Iron tablet, Again gave during check up. CRL gives, are giving. As I said before gave when I had low blood pressure. Forgot the name, that's it (7). For Iron, the doctor madams came to our house and said that I reduces blood deficiency, so they say that Iron has no problem (16). I take vegetables to fight your anemia? Aurum leaf and others, like sweet gourd. Produce blood. He says (indicating husband) and doctors also advises (5).

### 2.1.1.3 Allah

[Allah has authority] May Allah keep in good condition, Allah is everything.(8) Actually worry means.....Allah can do anything!(37) Allah knows every good and bad. Everything depends on Allah. Lord of everything is Allah. Allah can put in trouble also can save. (11) Allah send relief from trouble (15) Wish of Allah is accepted. Allah's wish is my happiness.(17) Allah is the guardian. I will follow whatever Allah does that.(24) Only Allah can do everything. Allah has his own power. He can do everything. (25) Allah's will is all. Everything happen by Allah's will. Human being is nothing. Who has created me, without his will, how can I move from here?(26) Allah is there for the poor people.(37) one has to keep faith on Allah.(37) I have left all to my providence and will of Allah. We have to proceed forward by keeping faith in Allah. God will do whatever he feels right for me and I believe in y providence. (40) Without Allah who knows that when and which can be happened ?(41)

[Fetus is a gift from Allah] They said to me that as it has been happened 'just keep it, do not destroy the fetus, Allah has given a baby'. I wanted to abort the baby but people said not to abort that. It is not good to destroy a baby. My husband also advised not to abort it. After listening that family members said to me that Allah has given you, in this case what should you do? Please keep it do not destroy.(9) When will born---this is a gift of Allah-this I cannot Say. (14) I have three children. Allah (God) is very kind. (20) Allah gives me a child that is son or daughter that's not more important.(27)

[Baby's gender is decided by Allah] Longing if a daughter is given by Allah. That certainly do. Ask to Allah. Tell to Allah (24). It's up to Allah. If I wanted a son, would it be a son! I do my prayer. Allah gave me a child that was son or daughter that's not more important. If I pray for a son and Allah gave me a daughter, then? (20) I used to pray to Allah. Only Allah can do everything. I wished it would be girl as I got a son in my previous pregnancy. I prayed to Allah also. This was my thoughts (25). I wish for a boy. I pray five times to god. Pray to god and cry to god. To have a boy. Anyone which god gives (36). Whatever Allah bestows that one. Had a desire for a boy, birth of a boy that's all. Prayed to Allah, used to tell through Namaz prayed, Allah did not give (10) Type of baby, now, whatever Allah gives, this human being cannot make to bring. Whatever luck favour by the grace of Allah, I take. Be nutritious, baby is fair, black. Anything that Allah may give, can human being create a good and fair one? Desire, whatever is given by Allah. Desire is---(interviewee starts talking). Even after that a person desires one that---(respondent starts talking). Everyone things of something isn't it? Expecting to have a daughter? Mother-in-law, husband, Nanad. Myself also expect a daughter. What shall I do? Allah to gift, whatever Allah gives that is all (8). Said within myself, whatever

Allah gives that one, if daughter is given will not throw away or if son is given will not throw away. But many one said that (feeble voice) sister in laws and others if you have a daughter then that will be all that you need, one son one daughter will not require any more. But I have said Allah's gift is the best, what even if a person wishes if Allah doesn't fulfill the wish? It is wish of Allah, Can a person even create an ant? (12) Want that Allah may give a daughter. Only ask Allah for a healthy baby (13). Since another is daughter that why I son. Want son from Allah, if Allah want then it will be. Nothing to do if don't give. My husband tells whatever Allah gives that is they cannot give by making a son (14). God is kind. He gives me the better one. I have my daughter and son (35). Son or daughter. This depends on Allah's wish. Surrendered to the wish of Allah. I do not think about this. (40)

[Various roles of Allah] Think "becomes afraid". About this about that becomes afraid. By the grace of Allah during my three this problem didn't surface. I didn't see these? May Allah not show me, I didn't see these (15). Vomit occurs, normally it occurs, many mothers normally have vomiting. I have observed that during this baby vomit did not occur Mash Allah (12). I don't worry at all. Allah is there, isn't He? Allah. Allah is there for the poor people. I always depend on Allah (37). Allah will get me will. If Allah and people help me, I will get rid from this tension. What should I do more, I will call Allah. Where will I get money? I do not have money, where will I go? Water is everywhere, people are (26). I believed in that if one worked there would be no problem with her health. I had always sought help from Allah that He never put me in trouble. Always I prayed to Allah (39). God will do whatever he feels right for me and I believe in providence. What should I do or ask? I offer Nafal And Hazateen Namaz (prayer beyond mandatory five times. Assuming that I have no money, I cannot fight the odds. Now by the blessing of Allah, you have come to me and said that you will give non refundable Taka 500 or Taka 1,000 or take me to hospital and I am out of problem or danger, like this Allah alleviates my problem. Allah will bless and with his blessing----- (talking to self) (40). Tangur means pain or many things happen. To baby's mother many thing happens. Allah is there to keep fine that's it (15). By the grace of Allah nothing felt awful, off course lifting load is felt awkward but I don't have to lift. Leaving aside this I can do everything by the kindness of Allah. And when couldn't eat then felt very bad. Due to not eating if fall sick how can feel good (14). I pray to Allah so that I stay well (26). Weakness, death due to anemia etc. I think of my children's future after my death. Because problems do not come with notice, may come or by the Grace of Allah may not come (40). Thinking was there. My mother I law had set everything right, meaning will take to the Hospital....while it was experienced the pain, my pain oh my pain....cannot step out of house, then brought the midwife...win the mean time by the Grace of Allah baby's head had set in (11). Like take the case many baby comes out reverse. Again you think many baby is born through caeser, isn't caeser performed at Chandpur. So many things happen. Meaning many types of, Prayer to Allah is that whatever happens does right that's it (12). Whatever I eat when I am pregnant, I eat the same thing when I am not pregnant. Allah gives whatever, we eat that (26). By the kindness of Allah I eat all food. No restriction is there (14). During this pregnancy, I have not been able to take that much of foods. But I can take more by the bless of Allah. Say, if we pass three months, I can take everything (38). I delivered my baby on the boat. They just pull me and took into a bed and God blessed me and my daughter was born (35). On that day she realized that she was affected by the air. From that very moment she started to feel difference. Her baby was miscarriage. Then again, she took help from hospital and some Kabiraz also. Now, with the blessing of Allah, she has given birth of a daughter (37). Actually worry means.....Allah can do anything! I am also worried about this time. I am praying that Allah bless me this time; I want a successful delivery. I am worried about that (37). Of course I think that Allah may keep healthy, so that cannot to any---healthily, (irrelevant talk) (8). If, now think the pain sets in, if it is delivered immediately on setting, there are instances may be delivered on way. If in the mean time With Allah's blessing there is delay of sort, then I will go. And if it is delivered then it cannot be matched with that.....if Allah has already wished (11).

[Allah will decide the time and the place of birth] It means the services in Matlab are well. The doctors of Matlab take more care. If I feel any weakness, or sleeplessness or having trouble with the baby they support a lot. It may have problem with baby, feel weakness, mother may die, have good doctors to take care of these. If baby is delivered by Allah, doctors will take care. It is seen (26). Expecting baby...say now cannot tell, wish of Allah...in this the supreme is the wish of Allah. Now when Allah wishes the day that day can born. This cannot be brought by force, it is there that cannot do anything but I have a date (11). Now expectation if Allah this is will of Allah's happiness. If it is good luck, if it happens will happen, if not at hospital. What is good luck, that is if according to Allah's wish it has been seen at the time, someone has pain for 1~2 days, someone has pain last for 3 days, someone delivers immediately, for that if it happens according to date then it happens, that is will of Allah, if it doesn't happen then support of hospital is there. (17) When will born-this is gift of Allah-this I cannot Say (14). Apa, when Allah's order comes at that time. It will not happen according to my expectation it will come as per Allah's desire. That time is another 2 months from now. Now it is eight months, 9th month, 10th month. Now, if it is advanced then it is, this is will of Allah. Earlier given earlier, later given Allah's will (17). Only the Allah can say when the baby will be born (35). God Almighty knows where. Say, as from my previous experience and as advised by the village doctor, I would want it delivered in the hospital (40). I have no idea what Allah is planning and what he will do? I have two normal babies...this one might not be one. Then I will have to go to hospital. Allah ....it will be deliver at hospitals (9). Now expectation if Allah this is will of Allah's happiness. If it is good luck, if it happens will happen, if not at hospital. If it happens according to date then it happens, that is will of Allah, if it doesn't happen then support of hospital is there (17).

[Allah's role and authority in delivery] Doesn't it occur? Thoughts do occur. How it will happen good or bad way, it is in thoughts. Bad way means, say, if the birth delays then one has to go under caeser. If the luck is good then normal delivery takes

place. May Allah keep in good condition, Allah is everything. By offering prayer people pleads to Allah (8). Now expectation if Allah this is will of Allah's happiness. If it is good luck, if it happens will happen, if not at hospital. What is good luck, that is if according to Allah's wish it has been seen at the time, someone has pain for 1~2 days, someone has pain last for 3 days, someone delivers immediately, for that if it happens according to date then it happens, that is will of Allah, if it doesn't happen then support of hospital is there. First daughter was born at hospital, at home they tried but it didn't deliver at home (17). I prayed regularly. I had always remembered Allah; I prayed to Him that as He had given me child then He might allow me to deliver my baby without any problem, so that I wouldn't have to pay money for that; That He cares for a poor like me (39). There is some normal anxiety. It comes. Now it's only two and a half months. After the full period passed and when I will give birth, what will be done by Allah. There are many dangers (or misfortunes or dangers). (I wish) Allah will give a smooth out (without dangers) - "Khalass", in this situation, means "out" (38). For remaining well so that everything Allah does in good state (feeble). So that Allah does the, that during delivery there is no problem. That's all. Like take the case many baby comes out reverse. Again you think many baby is born through ceaser, isn't ceaser performed at Chandpur. So many things happen. Meaning many types of, Prayer to Allah is that whatever happens does right that's it (12). Pray to Allah, so that Allah gives a healthy baby, always pray. For myself pray to Allah, so that Allah passes away danger in good stride, also that I do not have a danger as well the baby (13). Said whatever is required Allah will do. For everything depended on Allah. Prayed to Allah through Namaz. For remaining well so that everything Allah does in good state (feeble). So that Allah does the, that during delivery there is no problem. That's all (12). Read, whatever you will ask from Allah....was in trouble, Allah send relief from trouble. Think what born, how it born. People now falls in trouble when baby is in womb. Danger means if now baby born if anything happens, if someone becomes sleepless these thinking comes. At times baby dies also, children are there, so many things come in thinking. His father tells you do not think, do not take tension. Consoles tells do not give in to fear, Allah has given the hurdles Allah will send succor, offer 5 times Namaz and pray to Allah, Allah please rescue me intact. Means to pray to Allah so that take me intact (15). I was worried about the normal delivery or what if the baby gets stuck. Many babies die during the delivery. My baby had a big head, what if the head gets stuck or any accidents happen. I had these sorts of tensions. I used to lie down or sit with others and chat when these thoughts came. Tried to join with others and make my loneliness go away so that these feelings do not come again. There are times while lying down I had this thought and sat up right away. I used to say prayers. I used to pray 5 times a day, read the holy Quran and other prayers. I prayed to Allah that please keep my baby healthy, don't give it any problems and please keep it safe. I used to sit in the prayer and keep on chanting this (16). A kind of thinking remains for the baby in the womb, that when what happens. Isn't it a thinking? What is Frightening thinking? Allah-----in what condition happens. What condition means. What a tension. Allah willing in good condition everything happens or not, a thinking in the mind occurs, a consideration that---many a times it has been seen there is cut or slash. Isn't there a tension? Is not this required for many? When delivery is in progress isn't there a thinking? What other type of thinking, how will be the condition, inn the country, word you see what it is like. On getting a baby how to rear that. How will do what this thinking (17).

[Women's effort to plea to Allah] Used to pray that is there. Prayed after offering Namaz. So that Allah makes it easier for me. Take away troubles of sort. Think that baby is born normally. Or so that baby remain healthy. Is not there, many baby after birth have sickness, again mother may have problem also, at times mother also die, cannot there many problems (10). Whether good or bad that one how can I read the future. Whether Allah helps in delivering in good or bad... Bad means baby doesn't pass out. Mother dies. Again mother remains healthy (24). Allah knows every good and bad. If Allah helps a person can then can in many ways. And if Allah puts a person in problem then can put in many ways. Everything depends on Allah. What problem I may face, what problem may happen, how the delivery would be....doesn't many types of worries happen, how Allah succors don't know. So think all these thinking, everything of me depends on Allah. If Allah wants to take my life then which of the person can save me? Cannot. Person will try to save, for saving but if my time diminishes nobody can hold me back. What type occur...(feeble) cannot tell how many other type thinking is there. A baby will see the world what can I do to it or if may be there is a trouble ahead of me, due to the trouble whether I fall in nuisance or survive, this type of many thinking are there (11). What will do? Keep lying. Lay on bed when feel awkward. Undertaking too much tension---what Allah does that. Wish of Allah is accepted. Allah's wish is my happiness. Allah can take live. Can cut also, can do everything, we cannot do anything. Offer Namaz and keep fast what else to do (17). Weakness, death due to anemia etc. I think of my children's future after my death. Because problems do not come with notice, may come or by the Grace of Allah may not come (40). Doesn't it occur? Thoughts do occur. How it will happen good or bad way, it is in thoughts. Bad way means, say, if the birth delays then one has to go under ceaser. If the luck is good then normal delivery takes place. May Allah keep in good condition, Allah is everything. By offering prayer people pleads to Allah (8). Pray to Allah, so that Allah gives a healthy baby, always pray. For myself pray to Allah, so that Allah passes away danger in good stride, also that I do not have a danger as well the baby (13). I prayed regularly. I had always remembered Allah; I prayed to Him that as He had given me child then He might allow me to deliver my baby without any problem, so that I wouldn't have to pay money for that; That He cares for a poor like me (39). Think can occur. I do not think any one of these. Allah will do whatever is required. Isn't telling too Allah, that this offering Namaz, keeping fast, again doing Ebadat Bandegi, let if Allah says.....Lord of everything is Allah. Allah can put in trouble also can save (11). Said whatever is required Allah will do. For everything depended on Allah. Prayed to Allah through Namaz. For remaining well so that everything Allah does in good state (feeble). So that Allah does the, that during delivery there is no problem. That's all (12). What bad thinking, I have only prayer to Allah so that Allah bestows a healthy and energetic baby (14). Read, whatever you will ask from Allah....was in trouble, Allah send relief from trouble. Think what born, how it born. People now fall in trouble when baby is in womb. Danger means if now baby born if anything happens, if someone becomes sleepless these thinking comes. At times baby dies

also, children are there, so many things come in thinking. His father tells you do not think, do not take tension. Consoles tells do not give in to fear, Allah has given the hurdles Allah will send succor, offer 5 times Namaz and pray to Allah, Allah please rescue me intact. Means to pray to Allah so that take me intact (15). I was worried about the normal delivery or what if the baby gets stuck. Many babies die during the delivery. My baby had a big head, what if the head gets stuck or any accidents happen. I had these sorts of tensions. I used to lie down or sit with others and chat when these thoughts came. Tried to join with others and make my loneliness go away so that these feelings do not come again. There are times while lying down I had this thought and sat up right away. I used to say prayers. I used to pray 5 times a day, read the holy Quran and other prayers. I prayed to Allah that please keep my baby healthy, don't give it any problems and please keep it safe. I used to sit in the prayer and keep on chanting this (16). I was about this child, as I had two miscarriages; I always prayed to Allah that He keep my child healthy and sound. I used to say prayers more. I was always worried that I had done any heavy work for which I could have an accident (19). I expected nothing prayed Allah whatever you give let it be healthy. Maybe in inner soul longs would have been happy, even after that prayed Allah whatever you give let it be healthy. I do not want anything (19). I just prayed to Allah so that the baby become healthier and took my food regularly. I would pray to stay well. I prayed to Allah and took my food regularly (25). If people pray to Allah... Allah's will is all. Everything happen by Allah's will. Human being is nothing. Who has created me, without his will, how can I move from here? I pray to Allah so that I stay well (26). I saw some baby born with a lot of difficulties, so I prayed to god so that my baby gets birth with good physical condition (27). I believed in that if one worked there would be no problem with her health. I had always sought help from Allah that He never put me in trouble. Always I prayed to Allah (39). God will do whatever he feels right for me and I believe in providence. What should I do or ask? I offer Nafal And Hazateer Namaz (prayer beyond mandatory five times. Assuming that I have no money, I cannot fight the odds. Now by the blessing of Allah, you have come to me and said that you will give non refundable Taka 500 or Taka 1,000 or take me to hospital and I am out of problem or danger, like this Allah alleviates my problem. Allah will bless and with his blessing----- (talking to self)(40). Allah's wish is my happiness. Allah can take live. Can cut also, can do everything, we cannot do anything. Offer Namaz and keep fast what else to do (17). Then "saman" that son was in my womb. Then it was the month of Ramadan. In the month of Ramadan I did that, in the night, isn't potato there? Fasted despite eating this potato. Couldn't even eat properly. Then fasted that's it. Now also keep fast, then also was. One month sited as an example, one month is fasting, and rest of the period is not fasting. Not during Ramadan, during Ramadan didn't eat *Pushthi* (19).

#### 2.1.1.4 Alga

[Alga attacks everyone] Everyone can be harmed. Anyone, basically the ill-fated can be harmed (20). I got evil spirit (Kharap Batas). I went to wash fishes at the time of the magrib prayer, after then I got evil spirit, even before pregnancy (25). Touches every one. When baby is in the womb try that's it. May even die if superficial entity touches (24). Sometimes it make a person insane, you can see them (insane) in road. Sometimes it mixes with body. When it mixes with body person produce disorganize speech in here and there. They do various things (means -disorganized work) (41). Yes, makes her mad. And they also take away to some women/men (26). Different person had different diseases for that, the baby got blemished, may be someone is calling. Voot has effected. If the baby is blemished every individual apportions different reasons) this they abide (11). I got disease, unnecessarily I went outside of house and told some sort at contradictory and confusing discussion. Non-pregnant woman. I told not any real order, something like topsy-turvy, and also to rebuke others. Meaningless words, used to curse others (25).

[Khen – time specific cultural rule] Yes there are some selected time (khain). What is the selected time (khain) At noon, twilight (36). Sometimes, people are going outside at noon or at night. I cannot follow. But this is forbidden. I have to obey this. Many times people tell me you have to maintain (or obey) "khen" (meaning event or specific time related rule) (38). In the noon or to a forbidden place, baby could die. Elderly people say this (8). I told you that I did not go outside at noon. I maintained the "khen(event or time)". I did not go outside at noon that's it. I maintained. what can be happened don't know. Without Allah who knows that when and which can be happened (41). *Alga* can get for the selected person; I am pregnant so I am scared of it. *Alga* goes to their house where he has wished to make damage (36). If you are in the mouth (meaning center) of the wind, it can be harmful for myself. Older people say and other people also say...Animal's touch...At noon, you can't go outside. At noon there is time-related thing. Only for noon and night. Some people go out that time but it is forbidden only to me (meaning only to pregnant women) (38). As we like fish with eggs in its bally, they (*Alga*) also like the fish with eggs in its bally(26).

[Khen – place specific cultural rule] At noon. At around Zumma (12.30 pm). That time Azan is announced; then again at the night. Again, if one has the pressure for toilet during the Fazr time (4am -5 am at morning) she cannot go there. Then....she cannot go to any bad places (37). Sometimes when I intend to go out around 12 or 1 o'clock, they don't allow me to go. What can I do, I have to listen to them anyway. I wait a while and pass that time and go after that (16). Many people can be affected badly. I have seen my aunt-in-law, she was pregnant then. She went through the graveyard in the rain. As a result the next day the position of the baby got change. On that day she realized that she was affected by the air. From that very moment she started to feel difference. Then her baby was miscarriage. Then again, she took help from hospital and some Kabirazo also (37). The "evil curse" (Kharap Batas) was on the bathing place (Ghatla) (20). For noon, I meant that there was some wild place (jongla-tongla) in swamp, some cluster of bamboo. So, they suggested not going for that place at noon (20). In the noon or to a forbidden place. Elderly people say this (8). It is after coming from outside. Bad place has time (40). Can be affected by evil curse ("batash" kind

of superstitious belief) by going far from the house (36). I do not go many places at midday. I stay near at home. I do not go in this way. We stay near at home almost always (9). I didn't go anywhere, how I will follow the Norm, I am in the room, think room and the yard. If I went anywhere now, like in the Noon if went out it will be detrimental, will not go, this is, so I except work at the fire place in the house (11). The eldest suggested not going outside (Ojayga kujayga). That was the bad/cursed area. No one wants to go there alone. It is not better to go outside, far from the house at midday and midnight (35). Usually we do not go outside. There is a pond near our house. So we are not supposed to go around. They said, why would you go outside at midday, if anything bad happens? Elders say, we should not go outside (9). Say I have gone to pond side in the evening. Then bar don't come in the evening. Come before this (11). I didn't go to the pond or under bamboo tree at evening (39). One can't move through any bad area during pregnancy. There is a rule that women should be away from the graveyard at the distance of 45 hands (37, 4).

[Consequences of Alga's attack] Sometimes air harms the baby and causes miscarriage. I have heard it from my elders. It could harm me also. It could cause convulsion (39). Sometimes it (Alga) kills (pregnant woman) (41). They catch the baby, baby's mother and kill (26). May even die if superficial entity touches (24). If anything happen good than alright otherwise if anything happen bad than.. Suppose, bleeding can be happened (miscarriage) (36). Harm also occur to mother, mother may also die (15). It will harm that woman, it will be difficulty there. Say life will be lost and thus one will be harmed (40).

[Women tried to follow the cultural rule] Sometimes, people are going outside at noon or at night. I cannot follow. But this is forbidden. I have to obey this. Many times people tell me you have to maintain (or obey) "khen" (meaning event or specific time related rule). If you are in the mouth (meaning center) of the wind, it can be harmful for myself. Older people say and other people also say... Animal's touch... At noon, you can't go outside. At noon there is time-related thing. Only for noon and night. Some people go out that time but it is forbidden only to me (meaning only to pregnant women) (38). At noon, twelve o'clock, I went there. Suddenly my head felt dizzy. After I came back, I saw bleeding started. In this time, my menstruation stopped but why was this bleeding? What was going on? There were some nurses in the village, who gave medicines door to door. I went to her and she told me that it could happen during pregnancy. "It could happen. There are some problems. You just wait and see what happens." This bleeding continued for two days. Another day (meaning on the third day), I felt pain in my belly. That pain was like the one when child is born. Then I saw it fell down (41). Followed these say for betterment, so that during baby in the womb went out in the night or go out in the noon here or there wind then many thing may happen. Wind to many think .. Night, Noon, isn't there "an hour". Take only mother of baby's has to be careful (12). I do not go outside at noon time. Apa I cannot tell you. There is bad thing. It kills, many things They come from far away with air. They catch others also but prefers mother (26). Time means at late night I did not go to outside. I maintained by this way, it is told that at that time bad wind (*alga batash*). Yes bad wind (*alga*) can touch me (27). If I would have gone outside of home at night, sometimes it could be the impact of air (39). Say for example, going to various places, far away fields, going out in the afternoon are forbidden. In the noon, after dusk going out is forbidden. Going anywhere after the dusk is forbidden. Cannot go anywhere owing to ill-omened thinking. Cannot go far way places. Think bad takes place, think about mother's pregnancy. The pregnancy may be affected. Say, if you go out in the evening then both the baby and you may be harmed, pregnant woman may bleed. May pass by/into wind, baby in the womb---- Take for example, that influence of Bhut (bad fairy). It harms that's it. It bleeds, mother may be harmed. In the noon or to a forbidden place. Elderly people say this (8). For noon, I meant that there was some wild place (*jongla-tongla*) in swamp, some cluster of bamboo. So, they suggested not going for that place at noon. It's better to maintain for everyone. God save us from sickness. It should be. Illness has no guarantee. Did it occur with signal? Everyone can be harmed. Anyone, basically the ill-fated can be harmed. - About "evil curse" (Kharap Batas) (20). Went outside in the noon, walked this way and that (*emikka- omikha*) (20). Early morning, noon and evening (36). I follow my husband follows that's why has to follow. Any fish brought in the evening do not allow me to go near. Again after dusk do not allow to go anywhere. There is fear of Witches if I get afraid or if any problem occur to me, off course usually there remains no job after dusk (14). Not to go anywhere in the evening, not to go anywhere in the noon. What do I know they tell that (laughter). Think "becomes afraid". About this about that becomes afraid (15). I do not go many places at midday. I stay near at home. Midday .... evening.... I do not go in this way. We stay near at home almost always (9). Normally many a times used to tell do not go out in the evening, do not go in the Noon, problem is there, wind will touch (10). I didn't go anywhere, how I will follow the Norm, I am in the room, think room and the yard. If I went anywhere now, like in the Noon if went out it will be detrimental, will not go, this is, so I except work at the fire place in the house (11). Followed these say for betterment, so that during baby in the womb went out in the night or go out in the noon here or there wind then many thing may happen. Night, Noon, isn't there "an hour"? (12) Yes that has to be followed, like do not go out of house in the noon. Again in the evening cannot go out alone. Everyone bar going out during these periods. Detriment for baby as well the mother. May be afflicted with *wind* or so and many thing. No, doesn't occur to everyone the expecting mothers have to adhere (13). I followed days and time a little. Like I didn't go out at noon, never went anywhere on Saturdays and Tuesdays (16). That now it is noon time, it is seen that mother in law would not let me go. Would not let me go. In this condition do not go any place, anything ill-omened will happen. Or isn't there didn't allow to go to a particular house, didn't allow to do anything. Seen that at noon one thing will have ill-omen (17). Used to say do not go out after the dusk. Remain vigilant. Remain safe. That's all. Used to tell because otherwise there may be detriment if went out alone. I am alone Apa- in the house there is none (19). I didn't go far and also didn't go anywhere in the early morning and in night. Usually I tried to stay in my own room. A lot of beliefs we had and the serious advised this. Different people felt different type of problems during pregnancy. Someone gave unusual birth. They were harmed by something like "evil curse" [(Kharap Batas) - Superstition]. Someone even miscarriage (20). Do not go out

in the night. Go with light in hand. If any harm occur. If any superficial effect occur or wild wind touches, for this go that that's it (24). Yes. I maintained such as- should not go outside at 12 noon and at the time of Magrib Namaj. I didn't know the problem actually. My eldest persons suggested so (25). They suggested what food I should avoid and did not go outside during the midday period. They suggested eating vegetables and Spinach and not to go outside at midday and also suggested to be a good woman (35). At noon. At around Zumma (12.30 pm). That time Azan is announced; then again at the night. Again, if one has the pressure for toilet during the Fazr time (4am -5 am at morning) she cannot go there. Then....she cannot go to any bad places (37). Restrictions on lonely movement during mid day and evening. Going is restricted, nobody is allowed to go. 12 in the noon. 12.30 PM (40). I told you that I did not go outside at noon. I maintained the "khen(event or time)". I did not go outside at noon that's it. I maintained. what can be happened don't know. Without Allah who knows that when and which can be happened (41). It may be a miscarriage or may be afflicted with wind. The wind causes miscarriage in pregnant woman, that's it. May induce miscarriage (7). Did I tell you to do that. I site you an example. Say I go to pond in the evening. Since in the evening I had gone wind will touch me (41).

[Strategies to prevent or to cure Alga's attack] No I did not take any kind of Tabiz, a traditional way to secure body from any kind of bad wind which they believe. They bend this *tabiz* on their hand or like that (27). My sister in laws father gave this amulet, he is an Ayurvedic physician. He gave this to keep away all the demonic energy (laughter). I dint believe in this amulets before. Now I have to otherwise they scold a lot. I took this amulet before this baby was born, said that no demonic energy would come (16). They told that this armlet can solve the problem. He gave. That one hung up over the kitchen (pahal). Over there, where we cooked in the kitchen. It was kept near in the five as if it got the heat (20). I went to Huzur (Religious guru). He gave me the armlet Gave armle and recited water. I got well then (25). Wearing for this reason. Only wearing talisman does the job (24). Many keep Talisman with but I do not keep (13). At the time of going out of house keep a fire with me, fire means a Match Box. Earlier people tells that no harm comes if fire is kept along with (13). If I go outside I take lamp with me. Bad air fears from fire (26). I didn't go anywhere, how I will follow the Norm, I am in the room, think room and the yard. If I went anywhere now, like in the Noon if went out it will be detrimental, will not go, this is, so I except work at the fire place in the house (11).

### 2.1.2 Fetal death

[Fear of fetal death] What type- at times baby dies in the womb. Let it die, Mother also becomes--- doesn't remain healthy, remains sick (8). If Sometimes I feel stomach pain in that time I think the baby is moving. What is the condition of the baby? But sometimes it moves a little for that I become anxious. If the baby moves a little I become upset, I think why it does not move? But the time when it moves more I feel comfort. I become afraid when it moves a little. I become afraid thinking that has anything happened to baby why it is moving less? Is not there any fear. Suppose if the baby in my womb does not move there is a problem, there is a possibility of death of the fetus (9). I am worried. Several type of tension I have. Baby may Many type of accident can occur. Mother may die also. Many things may happen to mother with fear. In that time I feel worry (26). Think what born, how it born. People now fall in trouble when baby is in womb. Danger means if now baby born if anything happens, if someone becomes sleepless these thinking comes. At times baby dies also, children are there, so many things come in thinking (15). I was worried about the normal delivery or what if the baby gets stuck. Many babies die during the delivery. My baby had a big head, what if the head gets stuck or any accidents happen. I had these sorts of tensions (16). Yes, that the baby should remain all right after birth. That there is no problem (7).

[Mother's healthy is directly affecting the fetus' health] If I am well, child will be well. I need to fulfill because through this my health will be good, and also my child's health will be good. I think if I got vitamin tablet, my health was good and my child also be good. Say, if I am well, my child will be well and healthy (meaning healthy). They think that. They thought that if their daughter-in-law good, child would be good. (1). Fetus will remain healthy, it will be healthy if the mother is healthy. If other suffers from malnutrition then the baby will also have mal nutrition. If mother gets nutrition then baby will be healthy, mother will also be healthy, get nutrition, get a little energy. This is what the feel (6). My parent in laws are saying that their daughter in law (me) will remain in good health, my baby will also remain good, there will be no problem (7). Telling to eat you to eat good say if a mother can eat then baby in the womb of that mother also eating. If I do not eat it doesn't eat then isn't malnutrition happening? It may occur to me, may affect my baby as well, will occur to me thought (11). In bathing place (Ghatla), the curse occurred and she affected through me (20). My fetus took his food through me. So, if I ate much, he could get more (27).

[Women pled to Allah for health of babies] Pray to Allah, so that Allah gives a healthy baby, always pray. For myself pray to Allah, so that Allah passes away danger in good stride, also that I do not have a danger as well the baby (13). Used to pray that is there. Prayed after offering Namaz. So that Allah makes it easier for me. Take away troubles of sort. Think that baby is born normally. Or so that baby remain healthy. Is not there, many baby after birth have sickness, again mother may have problem also, at times mother also die, cannot there many problems (10). What bad thinking, I have only prayer to Allah so that Allah bestows a healthy and energetic baby (14). I was about this child, as I had two miscarriages; I always prayed to Allah that He keep my child healthy and sound. I used to say prayers more. I was always worried that I had done any heavy work for which I could have

an accident (19). I just prayed to Allah so that the baby become healthier and took my food regularly (25). I saw some baby born with a lot of difficulties, so I prayed to god so that my baby gets birth with good physical condition (27). I was worried about the normal delivery or what if the baby gets stuck. Many babies die during the delivery. My baby had a big head, what if the head gets stuck or any accidents happen. I used to say prayers. I used to pray 5 times a day, read the holy Quran and other prayers. I prayed to Allah that please keep my baby healthy, don't give it any problems and please keep it safe. I used to sit in the prayer and keep on chanting this.(16)

I didn't go outside at evening. I slept for a while in that room. Sometimes I didn't touch any fish right away after bringing from bazaar. I didn't go to the pond or under bamboo tree at evening. I did those just to check any sickness. What would happen! It might cause miscarriage. Sometimes it could be the impact of air. Sometimes air harms the baby and causes miscarriage. I have heard it from my elders. It could harm me also. It could cause convulsion or. It could cause any disease for me as well. Yes, if I would have gone outside of home at night. Convulsion. (39) Yes, they say that it's good for the baby to follow the times and occasions, this will make to bad effects go away. Some say that the baby dies or has physical problem. (16) Yes, I do not go outside at noon time. If I go outside I take lamp with me. As I do not have any companion There is bad thing. It kills, many things It can kill the baby also. As we like fish with eggs in its bally, they also like the fish with eggs in its bally. They kill the baby as well as the mother. They come from far away with air. They catch the baby, baby's mother and kill. Many die, many may not die. They do like mad people. They take away. (26) It will be detrimental if went outside during Noon. The baby will die, may be blood will start passing, detriment will happen. Everyone has a different mind frame (inaudible). Different person had different diseases for that, the baby got blemished, may be someone is calling Voot has affected. (if the baby is blemished every individual apporitions different reasons) this they abide. (11) Think bad takes place, think about mother's pregnancy. The pregnancy may be affected. Say, if you go out in the evening then both the baby and you may be harmed, pregnant woman may bleed. If one goes out, something happens, from remote. Take for example, that influence of Bhut (bad fairy). It harms that's it. It may bleed with air passed during defecation, baby may also die.(8) Move carefully in the evening, that you do not face any problem. Otherwise it may be a miscarriage or may be afflicted with wind. The wind causes miscarriage in pregnant woman, that's it----- May induce miscarriage. (7) Baby may miscarriage, and also sometimes air harms the bay and causes to miscarriage.(9) It's my own...Sometimes there is "Alga". People always maintain the "Khen" If you are in the mouth (meaning center) of the wind, it can be harmful for myself. Older people say and other people also say...Animal's touch...At noon, you can't go outside. At noon there is time-related thing. If you are influenced by the wind, you can be dropping (meaning bleeding) or abortion can happen. Say , I cannot tolerate to go out at noon (meaning due to the sunlight). I don't feel good to go out under sunlight. Only for noon and night. Some people go out that time but it is forbidden only to me (meaning only to pregnant women).(38) If you are influenced by the wind, you can be dropping (meaning bleeding) or abortion can happen.(38)Mother-in-law prohibited me to go. I could fall down. I had some pressure (meaning hypertension). If I fell down, damage of child (meaning miscarriage) could happen. There is some Alga-Talga. It could catch me. Villagers told me these types of so many things. One is already damaged (meaning miscarriage). If our water dries here, we have to go to another place for taking bath. At noon, twelve o'clock, I went there. Suddenly my head felt dizzy. After I came back, I saw bleeding started. In this time, my menstruation stopped but why was this bleeding? What was going on? There were some nurses in the village, who gave medicines door to door .This bleeding continued for two days. Another day (meaning on the third day), I felt pain in my belly. That pain was like the one when child is born. Then I saw it fell down. I saw in my panty. It fell, and it was like "chaka" (meaning a condensed). When it fell, I called them (meaning family female members) and showed it to them. They told me that it fell down. I didn't face any problems. I have a goat. A few days ago, I went to the field to take my goat. Then, that influenced me again. (41) But during pregnant period, this damages the thing and takes of it.(41) Detriment occur to mother, mother's detriment is detriment o baby. May be afflicted with wind or so and many thing. Detriment is caused to baby. Baby of someone may be disfigured someone may have a dead baby (13) They said that there would be an impact of bad. The impact of bad air is, there may be stomach pain.We do not follow the bindings and we go outside. Baby may miscarriage, and also sometimes air harms the bay and causes to miscarriage. We do not know about this because this did not happen to us(9) Can be affected by evil curse ("batash" kind of superstitious belief). I do not know, that's why I maintained (baicha)? Miscarriage can be happened. Harmful thing can be happened for me also. Suppose, bleeding can be happened (miscarrige). (36) *Alga* (evil curse) get them to damage the baby. (36) Yes. I did, I didn't go far from outside, or anywhere. Yes. I had to maintain a lot. I didn't go far and also didn't go anywhere in the early morning and in night. Usually I tried to stay in my own room. A lot of beliefs we had and the serious advised this. Different people felt different type of problems during pregnancy. Someone gave unusual birth. They were harmed by something like "evil curse" [(Kharap Batas) - Superstition]. Someone even miscarriage. (20) Harm may reach for reason or without reason. From jungle wind, you neither believe nor abide by. Villagers say this. Elders say this.. It is an air, made of Fire and water, comes and may be made of air. If wind touches body it harms. When wind comes and someone falls in front of it or in front of "Bankouri" whirl wind it can twist the person.. If someone falls before wind. It will harm. Many talk about paralysis. Again it damages the fetus. One vomits, Loose motion takes toll, many child becomes emaciated. Head and body dries. Their baby may be harmed or mother may be harmed. That fetus is destroyed or if mother is affected then it harms the fetus. It harms mother. From mother the baby is afflicted. Mother may feel feverish or may have loose motion. Mother may have head swirling. All this happens if one goes alone. Headache is felt.(40) It will harm that woman, it will be difficulty there. Say life will be lost and thus one will be harmed. (40) Say I have gone to pond side in the evening. Then bar don't come in the evening. Come before this. If went in the evening earlier people is to tell that in the evening if go to pond side baby will die, it will be the effect it will be the effect, said this. It could be miscarriage. Or came in contact with "evil curse" (Kharap Batas). Everything has some good



or bad side. We have also Hindu and Muslim. They differ from believes. Even be died. (11) Don't you understand that! Many people can be affected badly. I have seen my aunt-in-law, she was pregnant then. She went through the graveyard in the rain. As a result the next day the position of the baby got change. On that day she realized that she was affected by the air. From that very moment she started to feel difference. Her baby was miscarriage. Then again, she took help from hospital and some Kabiraz also. Now, with the blessing of Allah, she has given birth of a daughter (37)

If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work (38). Because heavy work will cause harm to Uterus. Damage to own health. If you have more babies, the uterus enlarges, the wall becomes thinner, and it may rupture on applying pressure. One may bleed at the uterus infrequently, one was taken to hospital for treatment and it was discovered that the uterus had ruptured. In the hospital treatment was given. The fetus was in the womb, it was a premature case of delivery. She had picked a heavy pitcher. There are elders, who advise not to perform heavy work or carry anything heavy. One also feels bad, when I perform a heavy work, I feel tired. (40) It could be that if I had done then it might harm my baby inside my belly.(39) It may have problem to my fetus. The point of womb may come down and harmed fetus. It may break the chest of baby. Say, it may get a hit/pressure (25) They said because if I pulled heavy vessels then it could harm the position of my baby. It could get hurt or have breathing problem.. But, I had to work as my mother-in-law didn't let me to avoid these harmful things. She wanted me to work. (39) If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work (1). Heavy task, say, the heavy pitcher, fetching water with large pitcher. Take as an example; I can lift 1 Kg, 1.5 Kg weighing rice Haree. But cannot lift Haree of 5/10 Kg rice. These are said, as these may cause damage to the fetus (7).That Ajmeri Apa used to say, then mother said, aunt said, everyone said, then people of homestead also said.....that do little heavy chores, or job requiring more Said these so that baby remains healthy, remains all well, all these work.....It may harm the baby.(12) As my previous two babies were miscarriage I felt tension this time. I took rest all the time bearing in mind if this time I had miscarriage! I used to go ICDDR,B, for regular check-up. They were also caring for me as I had two miscarriages. Otherwise if had another! That's why they checked me frequently whether there was any problem or not. I used to drink plenty of water, I didn't do any heavy work, I ate plenty of green leafy vegetables, eggs, milk and fruits etc.(19) It may harmful for the fetus, baby may be placed aside, mother gets pain, mother can not stand up. If she works heavy work, baby can get out from uterus. Baby's hand or foot may come outside from the uterus. (26)

Think in pregnancy no powerful medicine can be eaten, do not allow to eat. think powerful, such powerful medicine is not given for eating, it would have harmed baby. Only know this that baby may die (11). No harm will occur to me but may harm the baby. No, No if medicine is taken the baby may be defective, baby may be defective, may die (13). Why I used to feel, if that harms the fetus in anyway So that it does not induce miscarriage (7) They said not to take the medicine. They moreover said, 'if you take medicine your fetus will be affected'. If I take a medicine without prescription, it would be very bad with me. My fetus would miscarriage I might be sick so that they advised me not to take medicine without prescription of a doctor (9). I did not take the medicine for gastric every time. They told that it could be created problem. My parents-in-law. They suggested not eating any medicine. It could be miscarriage. They prohibited me but I took medicine after three months. I have to save my life also (27). No, doctor did not suggest. Doctors do not give powerful medicine. He advised not to take much medicine, should not take powerful medicine, it could be harmful for fetus. My fetus may die. (25). I am not allowed to take any powerful medicine during my pregnancy. Family doesn't allow me to. Say for example; I have been given tablets for fever and allergic problem. But, I am not allowed to take those. Mother understands everything, for example, about the powerful tablets; everyone knows that it's harmful. It is the painkiller. It is powerful. One can easily understand that, if one takes it, it will be harmful (37) During pregnancy, if back pain arose, doctors would give pain-killers (for back pain or arthritis or for other types of pains). They would say that don't take that type of medicine because it is harmful (38). Tablets which are normally taken for fever, because those are powerful (39).

Pineapple. It is harmful to eat. It causes vomiting. If anyone take milk along with pineapple she/he may die. It was not restricted at other time but should be careful at pregnancy period. We must be careful whenever we eat. Now I have eaten pineapple and then take milk it is seen that fetus if they drink milk after eating pineapple: Other time we can eat but there is a way. If we take when the baby is in womb, .pregnant women cannot take that. God forbid, any baby in the womb may die for eating pineapple. It may die. (26) Pineapple is not eaten when baby is in womb. It is said that baby dies if Pineapple is eaten. Don't allow to eat pineapple. Tells will be problem for baby. Abortion takes place. (hey what problem occur?) dies that's it. (10) There is nothing forbidden, only pineapple. One can't eat pineapple during pregnancy If one eats pineapple during pregnancy there can be the abortion of the baby (37)

If I run, harm may occur to my baby. Miscarriage and death.(13) Didn't eat Pineapple. Harm occur if eaten for that. Many said Pineapple cannot be eaten after that I didn't eat. On eating that the baby may be blemished that's why I didn't eat. It was said once I didn't eat out of fear. If abortion take place, do not eat out of fear. (19)

As my previous two babies were miscarriage I felt tension this time. I took rest all the time bearing in mind if this time I had miscarriage! I used to go ICDDR,B, for regular check-up. They were also caring for me as I had two miscarriages. Otherwise if had another! That's why they checked me frequently whether there was any problem or not. I used to drink plenty of water, I didn't do any heavy work, I ate plenty of green leafy vegetables, eggs, milk and fruits etc. (19) Here sisters from ICDDR,B said

the baby could not be delivered normally because it was big, even if it happens the baby will get stuck because of its big tummy. Then we went to see another doctor who sits at Mother Care, we went to see her. She asked to do a 4D Scan, we did in the laboratory, after seeing the report she said that the baby will not survive but it doesn't need a scissor-surgery, it will be a normal delivery. She got me admitted into Bangladesh Medical, after that the baby was delivered...the baby died. They said the baby can't be saved, everything was ok except for the baby had a big tummy. For this baby, when it was 8 months old, I came to my 4<sup>th</sup> visit here, they said the baby has a big head, this baby. That baby had a bigger tummy and this baby has a bigger head. I mean in comparison to its body the head is slightly big. I went to Chadpur, here they do ultra sonogram every week but after having it done by Mizanur Rahman, he said the baby doesn't have any problem but the head is slightly bigger than it should be, its not a problem. Then on the 30<sup>th</sup>, last 30<sup>th</sup> I went to the hospital again. Then I was sure that the baby is alright now, I was very worried before that. (Speaking to another woman in a different topic) (16).

It may harm the baby. The baby can be abnormal. To get a safe delivery and healthy baby we should follow the doctor's suggestions.(25) Any types of harm occur if it touches. Think the fetus may be disfigured (12) May be afflicted with wind or so and many thing. Detriment is caused to baby. Baby of someone may be disfigured someone may have a dead baby. This is called bad wind (13). If medicine is taken the baby may be defective, baby may be defective, may die. (13) Think "becomes afraid". About this about that becomes afraid. Baby will be harmed during pregnancy. Baby dies, or baby blemishes. Baby is disfigured. (15) Yes, they say that it's good for the baby to follow the times and occasions, this will make to bad effects go away. Some say that the baby dies or has physical problem (16). There was no way to make these tensions go away. (Laughter) It lasted till the baby was born, whether the baby is sick or handicap. I went to the doctor every month for check-ups. Still I was worried. Yes I was worried. After 30<sup>th</sup> when madam said that the baby is in good health and has good growth, head is also ok, no problem, then I was a little tension free that everything is going fine. Before that I was worried a lot (16). I cannot take such a medicine why that may cause harm to my fetus. Fetus may be disfigured. Fetus can be spoiled (17). Many said Pineapple cannot be eaten after that I didn't eat. On eating that the baby may be blemished that's why I didn't eat. It was said once I didn't eat out of fear. Eating Pineapple was restricted. (19) They say that in this condition cannot take high power medicine. May cause quite a harm to baby. Yes may cause harm to baby may be blemished. At times baby may become protibondi (disable). Medicines which can be taken in normal condition cannot be taken while in pregnancy, harms baby.(14) Different person had different diseases for that, the baby got blemished, may be someone is calling **Voot** has effected. (if the baby is blemished every individual apportsions different reasons) this they abide. (11)

Yes, they say that it's good for the baby to follow the times and occasions, this will make to bad effects go away. Some say that the baby dies or has physical problem. (16) Different people felt different type of problems during pregnancy. Someone gave unusual birth. They were harmed by something like "evil curse" [(Kharap Batas) - Superstition]. Someone even miscarriage. (20) I maintained by this way , it is told that at that time bad wind (alga batash). Yes bad wind (alga) can touch me. Many kind of problem can be occurred from the alga , but in real sense I do not believe that. But still I maintained. Because I was scary about if any kind of problem create from that. Like baby's body can cramp. (27) If wind touches, any types of harm occur. Think the fetus may be disfigured (12). Detriment occur to mother, mother's detriment is detriment o baby. May be afflicted with wind or so and many thing Detriment is caused to baby. Baby of someone may be disfigured someone may have a dead baby. This is called bad wind.(13) Think "becomes afraid". About this about that becomes afraid. By the grace of Allah during my three this problem didn't surface. Baby will be harmed during pregnancy. Baby dies, or baby blemishes. Baby is disfigured. (15) Do not view good to taking of medicine during pregnancy. What happen in eating which medicine cannot be foreseen. No harm will occur to me but may harm the baby. If medicine is taken the baby may be defective, baby may be defective, may die. (13) When I, when I do not have a baby in the womb then I can take those, now it is not possible to take those. It has been seen now I cannot take such a medicine why that may cause harm to my fetus. Fetus may be disfigured. Fetus can be spoiled. (17) They say that in this condition cannot take high power medicine. May cause quite a harm to baby. Yes may cause harm to baby may be blemished. At times baby may become protibondi (disable). Medicines which can be taken in normal condition cannot be taken while in pregnancy, harms baby.(14) Cannot problem occur in the brain if excessive medicine is taken? Brain in many cases goes out of order.(19) If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work(38). Didn't eat Pineapple. Harm occur if eaten for that. Many said Pineapple cannot be eaten after that I didn't eat. On eating that the baby may be blemished that's why I didn't eat. It was said once I didn't eat out of fear. Eating Pineapple was restricted. (19) They said that I can eat everything. There is no restriction. In the old times the mother couldn't eat fish for a week. They say that it causes skin problem for the baby. They say that baby gets skin rash I the mother eats fish. They say if you eat fish those rashes would become worse and won't go easily (16). Detriment occur it is said that in many instances baby remains malnourished, how!-----problem is seen in the brain of baby, these problems. (19)

### ***2.1.3 Abnormal birth outcomes***

[Allah's role in anomaly of babies] Of course I think that Allah may keep healthy, so that cannot to any---healthily, (irrelevant

talk) (8) Used to pray that is there. Prayed after offering Namaz. So that Allah makes it easier for me. Take away troubles of sort. Think that baby is born normally. or so that baby remain healthy. Is not there, many baby after birth have sickness, again mother may have problem also, at times mother also die, cannot there many problems (10) Pray to Allah, so that Allah gives a healthy baby, always pray. For myself pray to Allah, so that Allah passes away danger in good stride, also that I do not have a danger as well the baby. Only ask Allah for a healthy baby. (13) Type of baby, now, whatever Allah gives, this human being cannot make to bring. Whatever luck favour by the grace of Allah, I take. Mother remains healthy, baby also remain healthy. (8) My baby didn't have any problem. By the grace of Allah was born wholesome as regards to nutrition, didn't born mal nutrition, may be baby born is less strong, despite many diseases around but he is good in this aspect. Didn't born mal nutritious. Was 3 or 3.5 Kg. (11) Baby born was healthy. Was fatty of sort. This was also mash Allah fatty at birth (12) What bad thinking, I have only prayer to Allah so that Allah bestows a healthy and energetic baby. (14) I prayed to Allah that please keep my baby healthy, don't give it any problems and please keep it safe. I used to sit in the prayer and keep on chanting this. (16) I was about this child, as I had two miscarriages; I always prayed to Allah that He keep my child healthy and sound. I used to say prayers more. I was always worried that I had done any heavy work for which I could have an accident. (19) I expected nothing prayed Allah whatever you give let it be healthy. A. Maybe in inner soul longs would have been happy, even after that prayed Allah whatever you give let it be healthy. I do not want anything (19) My every child were looking better after delivery (MashaAllah!) .The last one was 3kg 220 gm. Everyone got better health (God bless them), after their birth, they lost their sound health. (20) I just prayed to Allah so that the baby become healthier and took my food regularly. I would pray to stay well. I prayed to Allah and took my food regularly (25) I saw some baby born with a lot of difficulties, so I prayed to god so that my baby gets birth with good physical condition. (27)

[Other causes of anomaly of babies] Yes, I felt tense. I tensed about the labour pain, if it starts at home. I heard that many women gave birth after feeling labour pain, if this happens during my time. The fetus came first with his hand and legs and got hurt in his brain, then what would be. I was anxious with this. Anything danger may happen (25)

Yes I was concerned. That one of my babies was sick, in this situation what would happen to this one. We were married between relatives. I am married to my cousin. Some say that if the blood group is same the baby is born as a handicap. So I had this kind of tension. (16)

[Other conditions of babies pregnant mother concerned] I went to Medical and checked up. They diagnosed me. If I felt any trouble, then went there. I went in the Medical 7 or 8 days before. They diagnosed me and found that my fetus is thin in size. No, there is no fluid. (36) The last one was less healthy. It was smaller in size (9) If I do heavy work, child can be weak and it can problem also (38). Used to pray that is there. Prayed after offering Namaz. So that Allah makes it easier for me. Take away troubles of sort. Think that baby is born normally or so that baby remain healthy. Is not there, many baby after birth have sickness, again mother may have problem also, at times mother also die, cannot there many problems (10). . This is my child, its health condition...! Don't you understand! If its in good health condition, then it's matter of another tension. So, about everything, I am worried (37). After 8 days. Within these 8 days his body became so weak. His body had no strength, it became loose. He didn't make any sound even. He didn't have any strength. He didn't suffer from fever. He was taken to hospital. We went to a Yakub Ali Kabiraz also. We went to hospital twice. They didn't say much. He didn't catch that much cold. They had given a certain time; they said, "if within that time the level of chest gets lower then you can assume that your son is suffering from pneumonia and if it doesn't then it's not". They said, "it was mild cold. So, if you find any more trouble bring him here again". So we came back. 3 days after that my son died (4). If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it. (11). Baby had weak physique, was in hospital for many days. After that it came in mind the baby was not fulsome, baby born was weak, where went the Pushthi? Went to hospital, was afraid, baby is physically weak, baby cannot eat properly, so he said to do the way they say (15). No, I don't see anything. I did not get any benefit- My first child is very weak (25).

## 2.2 Delivery related concerns

### 2.2.1 Big baby

[Women acknowledged big baby related practice] Who can eat more their bay born is fattier. Troublesome in delivering (giggles). Many say that eats so much how large will be the baby? There will be trouble at the time of delivery (12). The elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery. The elders say that by feeding nutrition they make the baby big inside the womb (16). They think that if I take the vitamins, the baby would become bigger inside the womb and it will cause problem for the delivery (16). I ate some more at before. I did not have any tension about this. I tensed only that if my fetus will be big in size then it could make a problem during delivery. Many people told that if mother ate much then fetus will be big in size and arise trouble during

delivery time (27). Yes, sometimes. I was asked because if I had eaten more then the size of my baby would be bigger. Then I would face problem during my delivery. Doctors from the Siarel said that. I also knew that the size of my baby would be bigger and it would cause problem during my delivery. They used to advise me to eat less but I should eat frequently. (39) Earlier people is to say (voice wanes), during mother and aunts. If one takes more food size of the baby becomes larger. Baby is harmed at the time of delivery, mother feels uncomfortable? Mother falls ill, they said that (6).

[Consequence of having a big baby] My daughter was big in size, so it had to cut in a side (35). Again who can eat more their bay born is fatter. Troublesome in delivering (giggles). There will be trouble at the time of delivery (12). They think that if I take the vitamins, the baby would become bigger inside the womb and it will cause problem for the delivery (16). I ate some more at before. I did not have any tension about this. I tensed only that if my fetus will be big in size then it could make a problem during delivery. Many people told that if mother ate much then fetus will be big in size and arise trouble during delivery time.(27) Yes, sometimes. I was asked because if I had eaten more, then the size of my baby would be bigger. Then I would face problem during my delivery. Doctors from the Siarel said that. I also knew that the size of my baby would be bigger and it would cause problem during my delivery. They used to advise me to eat less but I should eat frequently. (39)

About the whole program, the elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then it's difficult to have a normal delivery for that baby and it requires a scissor-surgery. It's a trick of them to have scissor-surgery, they make the baby big inside the womb so that it cannot be delivered normally, it brings benefit for the doctors. This is what the elder people say, and we think that if the baby is healthy inside the womb then it will be healthy after it's born, it would not get sick. That's our opinion, but the elders say that by feeding nutrition they make the baby big inside the womb (16). Normally if we get sick we take medicines so it is ok to them, but during the pregnancy if we take medicine the baby may become big, that's why they don't like us taking medicines if we are pregnant. It would cause problem for delivery, it won't be normal and will require scissor-surgery, they comment like this. (16)

[Women did not believe in the big baby belief] Nobody eats less, like take it that she eats like herself, take for example I cannot eat, like this every one is like others. Many say that eats so much how large will be the baby? There will be trouble at the time of delivery, take my sister in law is fine, they say how large would be the baby if eaten more? I say that one should eat as one can, now you can eat you can eat, you have desire, won't you eat then? (12) The elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery. This is what the elder people say, and we think that if the baby is healthy inside the womb then it will be healthy after it's born, it would not get sick. That's our opinion, but the elders say that by feeding nutrition they make the baby big inside the womb (16). No. this is not heard this days. Previously people is to say lie this. Earlier people is to say (voice wanes), during mother and aunts. If one takes more food size of the baby becomes larger. Baby is harmed at the time of delivery, mother feels uncomfortable? Mother falls ill, they said that. And these days say to take more food, that will keep baby healthy, mother will remain healthy. Again baby will be smaller (40). We do not do anything like this (14). Do not do this or try to eat properly, so that baby will be nutritious.(15) No. I ate as much as I can (25) Who eats a lot her baby will be strong and healthy. Mother will be well and he baby will be good in health. If eats good food? There is nobody here to follow this rule. Mother will be strong, mother will not be weak, baby will be good and strong. No I did not follow this rule. (26) If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it. (11) Long before these is to be followed (sound diminish). Later ones, which one----- (sound diminish), which one, Rabiul or Rahman, went to parental abode, one said that's all. No. I do not believe--- They used to say, I used to listen--(sound diminish). Ate if got otherwise not (40).

[Contradictory idea regarding big baby belief] People, the seniors told that if mother took more food than her fetus remains better and if she took less than fetus would be big in size. Then it would be easy during delivery time (20). One practice if belly is empty then baby will be large, and if belly is filled then the baby will be small. The elders tell, everyone tell, neighbors, father in law mother in law (13). Does baby become large on eating more? Gets space in the womb. This you think earlier era people used to tell now we do not believe this. Said that if eaten more baby becomes smaller mother have problem during delivery. If delivered quickly think trouble is less at delivery. This was said by earlier people. (11) And these days say to take more food, that will keep baby healthy, mother will remain healthy. Again baby will be smaller. (40) If mother ate much then he child grew better. It's not better- if fetus is so big. If the fetus is big than mother should eat much and if small than should eat less. I eat what get (36).

[Women preferred strong and healthy babies] If mother ate much then he child grew better. It's not better- if fetus is so big. I eat what get. I gave strong baby. Big and strong. I always give strong big baby. Not so much pain I felt for it. I have three children. Everyone was born well (36). Who eats a lot her baby will be strong and healthy. Mother will be well and he baby will be good in health. If eats good food? There is nobody here to follow this rule. Mother will be strong, mother will not be weak, baby will be good and strong. No I did not follow this rule (26). The last one was less healthy. It was smaller in size (9) And these days say to take more food, that will keep baby healthy, mother will remain healthy (40) Take people eat, so that the baby is a little Pushtha, is energetic, born like this. Again who can eat more their bay born is fatter (12). This is what the elder people say, and we think that if the baby is healthy inside the womb then it will be healthy after it's born, it would not get sick. That's our opinion (16). At parental abode they used to tell that for eating that after eating Pushthi the baby will remain healthy. Baby will be big. Neighbors who gave Pushthi said so (19). It is said fruit keeps the baby healthy. Baby born is voluptuous. Is fatty (8). Its proved that because

I had taken the nutrition my elder, 2nd and younger daughter were born weighting up to 4 to 4 and a half KGs. And by the grace of Almighty Allah those babies didn't get that much sick after they were born (16).

### ***2.2.2 Cesarean section and episiotomy***

[Women preferred vaginal delivery over C-section] The first baby was through Caesarian Section (C.S). This time also, whether it will require C.S. or otherwise, thoughts like this. No problem, but it would have been better if it were a normal delivery (7). Thoughts do occur. How it will happen good or bad way, it is in thoughts. Bad way means, say, if the birth delays then one has to go under ceaser. If the luck is good then normal delivery takes place (8). What a tension. Allah willing in good condition everything happens or not, a thinking in the mind occurs, a consideration that---many a times it has been seen there is cut or slash. Isn't there a tension? When delivery is in progress isn't there a thinking? What other type of thinking, how will be the condition, inn the country, word you see what it is like. On getting a baby how to rear that. How will do what this thinking (17). I did not feel any kind of tension because I went to hospital always to check up. So I did not feel tension but sometimes I feel scary so that I have to do seizer for giving birth the baby (27). Didn't have any bad thinking, means there was a tension whether it will born normally or through cesarean section. Whether it will be difficult or there used to be a tension. There used to be, think like whether baby will born normally or caesarian means everyone has a fear of birth process? (10). I have no idea what Allah is planning and what he will do? I have two normal babies...this one might not be one. Then I will have to go to hospital. Allah ....it will be deliver at hospitals (9). I have never thought of a scissor. I had my child before. Had I ever thought of scissor! (39)

[Cost of C-section – the most concerned] Then I thought that the worst condition. I did not have that much money. Child had not come yet. I did not feel any pain. Where I have to go... If Cesarean needed, how I could manage a lot of money. That's why I felt worried (2). there is much expenditure for delivery. From, where would I arrange all those! I worried about it. There is much expenditure for delivery. From, where would I arrange all those! I worried about it (5). Say, I may need operation, which may require a good amount of money (6). It's not so easy because we are in a joint family. Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer. I tried to eat more for my child's safety (27). Suppose...earnings of my husband is..if we go to hospitals then we need to pay the rent...that is a matter of worry...if something happens..Anything can happens during the delivery. Say they take knife...they do scissor operations. No one is having normal delivery. They are "delivered mother"...scissor or side scissor happens...or you have to go for knife. ... If Cesarean needed, how I could manage a lot of money. That's why I felt worried (41). I had already two children. I did not want to have another baby. But again I took it (meaning became pregnant). So this type of thing (meaning C-section) happened. I was anxious because the date already passed. Then I thought that the worst condition. I did not have that much money. Child had not come yet. I did not feel any pain. Where I have to go...(41) Suppose...earnings of my husband is..if we go to hospitals then we need to pay the rent...that is a matter of worry...if something happens..Anything can happens during the delivery. Say they take knife...they do scissor operations. No one is having normal delivery. They are "delivered mother"...scissor or side scissor happens...or you have to go for knife (9). There is much expenditure for delivery. From, where would I arrange all those! I worried about it. I have never thought of it. I had my child before. Had I ever thought of scissor! (39) There is much expenditure for delivery. From, where would I arrange all those! I worried about it (39).What else should I think? Whatever had to occur had occurred, think of anything ominous. Say, I may need operation, which may require a good amount of money (40).

[Long recovery period after a C-section] Like many works, including heavy works that is required to be performed in in-laws house. Everybody says that heavy works cannot be performed, if violated otherwise there will be a lot of problem, all these. After baby is born. Say for three months (7).

[Potential conditions that could lead to C-section] Yes, twenty five days over. And they kept me two to three days and tried. They tried normal process but they couldn't. I had already two children. I did not want to have another baby. But again I took it (meaning became pregnant). So this type of thing (meaning C-section) happened. I was anxious because the date already passed (41). Will born, what thinking? Shall have to go to hospital, after going to hospital they will observe. Bad way means, say, if the birth delays then one has to go under ceaser (8). About the whole program, the elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery (16). During the pregnancy if we take medicine the baby may become big, that's why they don't like us taking medicines if we are pregnant. It would cause problem for delivery, it won't be normal and will require scissor-surgery, they comment like this (16). Then we found that position of my baby was displaced, it was at higher level. It was not getting down. Then, the baby licked stool inside. Then they sent me to Chadpur. Like, now he has come since I have my ensuing delivery, or goes for scissorion section. Cannot arrange money (39). Like take the case many baby comes out reverse. Again you think many baby is born through ceaser, isn't ceaser performed at Chandpur. So many things happen. Meaning many types of, Prayer to Allah is that whatever happens does right that's it (12). My fetus had some problem, and he was in a wrong direction. 'BIRJARA' baby. Doctors says birjara. Head does not comes first of the birjara baby. The baby was in a wrong direction. Legs came first and then head. We thought about seizer but they told that it need not. The delivery will happen normally. Last of all the delivlery was done in Chandpur (25).

[Suspicion about doctor's decision for C-section] Even in this time when I got to know that the baby's head is big; I asked them if I need scissor...they can do it. But the doctor said no, you will have a normal delivery. That's how I came to know that the doctors do not send their patients for scissor-surgery so easily (16). It's a trick of them to have scissor-surgery, they make the baby big inside the womb so that it cannot be delivered normally, it brings benefit for the doctors. This is what the elder people say (16).

[Concerns regarding Episiotomy] Suppose...earnings of my husband is..if we go to hospitals then we need to pay the rent...that is a matter of worry...if something happens..Anything can happen during the delivery. Say they take knife...they do scissor operations. No one is having normal delivery. They are "delivered mother"...scissor or side scissor happens...or you have to go for knife. They do scissor in just in the side of the body...they cut a little ...in the path way where we urinate (9) Doesn't the passage tear if healthy? For this reason many goes to hospital, doesn't stay at home. Assume many mother are like this that. And if one goes to hospital they deliver by applying incision in the passage. So that if the baby is born big (12). My house is in Khadirgaon. My every diagnosis were done in Khadirgaon. I told to do all diagnosis again in Matlab. So, all diagnosis did in Matlab. After than I felt the labour pain on the date 28 and gave birth that day itself. They did so many diagnosis after going there and served me medicine and gave a Salain and the delivery was done then That was normal delivery, but they made a little cut in a side. 'Side cut' means, one is operation, another one is 'cutting side. Sidi cut mean, to make a simple operation in the path of Uterus during delivery. Then I stayed 9 days in hospital. They looked after and gave treatment. To me and to my baby also (25) In hospital- if anyone did not have more labor pain, then they gave medicine or injection for the actual labor pain or they took the process of Dhus'. They also took the 'Dhus' process for me. They supplied some hot water into the uterus and gave it out. It was comfortable during the delivery time. It was given me at the time of the first child. At the time of my first delivery- the fluid open for 5 days, but no actual labor pain. So, I went to hospital and they did Ultrasonogram and diagnosed. They found that there was no fluid in the womb. Then they send me to Chandpur. First time we went to Chandpur Sadar. There was not any better treatment. The doctor was crazier to treat patients in their own clinic for the big money. We saw that people is dying there and to see that we went out of there. We fled away. The next day I felt a pain, and then I went to Khader Gaon Hospital. ICDDR,B hospital. I did not able to manage the pain. I was young that time and no experience. I shouted. They took me to Matlab with their own boat. They called for better doctor. We were just reaching Matlab and my daughter was born. They just pull me and took into a bed and God blessed me and my daughter was born. My daughter was big in size, so it had to cut in a side (35). What condition means. What a tension. Allah willing in good condition everything happens or not, a thinking in the mind occurs, a consideration that--- many a times it has been seen there is cut or slash. Isn't there a tension? Is not this required for many? (17) Some baby dies again at the time of delivery it tears off, many things happen (13). . Detriment may occur----may be-at the time of delivering baby---can't get torn or so! (14)

### ***2.2.3 Delivery places***

[Reasons women preferred hospital delivery] Many at home can help in delivering the baby and many others cannot, there arises many problems that are why I want it delivered at hospital. Take for example before onset of pain many insert hand and some opine the baby is healthy, someone says good, others start pulling the baby amongst them, someone presses the belly, puts oil and many other things they do, that is why delivering baby at home is not desirable, I think hospital is a safe and better place for the purpose (7). My Ja she delivered a baby.....then immediately after birth the Placenta did not detach. Doesn't detach.....after that while she was being carried to Khadargaon on the way she had died. Mother's Placenta doesn't detach, baby was born to my Ja, then while she was being taken to Khadargaon she died en route. If the Baby was born ( in a hospital) she wouldn't have had any problem.....saline injection would have been given to her, quickly would have detached the Placenta by bundling. Her (feeble voice) dying since not held (11). Want to deliver at Hospital. A. At Hospital it will be good may be bad at home. Some baby dies again at the time of delivery it tears off, many things happen. These can happen such bad at Hospital these do not occur, this said. (13) My fetus had some problem, and he was in a wrong direction. 'BIRJARA' baby. Doctors says birjara. Head does not come first of the birjara baby. The baby was in a wrong direction. Legs came first and then head. We thought about seizer but they told that it need not. The delivery will happen normally. Last of all the delivery was done in Chandpur (25). 12 hours for delivery! The patient will be sent to hospital for delivery. These are all written in health card (40). What they teach, so that the mother remain healthy and baby also remain healthy. Remain healthy that is to say bleeding takes place on birth of a baby, in the village they do hold something, say about delivering a baby without a midwife. Have to go to hospital. At hospital less blood passes (8). At hospital...problem.....it has many advantages.....there is many good things.....many of us (went to) hospitals. People from ICDDR,B also suggest us about the advantages of delivering the baby at hospital. So I will go to the hospital to deliver, it has many advantages. One of the advantage is they do not do anything that will cause risk for a mother. They are very careful while delivering the baby. They do many things....they do ultra sonogram...they look at the position of the mother. They take good care that is why hospital is better. Risk...is it better from that sense...it is the hospital ..that is why. I gave birth to the previous two baby at home all by myself...I did not feel any pain (9). Now in my residence think...in Hospital...if born in Hospital very good. Good is, my Doctor is there nearby then I have good facilities from all sides. If I can cover the time then I will go to Hospital. Time say my middle child was born immediately after setting in of pain, didn't get time to go to Hospital, mean while my baby was born. During the eldest baby pain was for two days then I didn't remember.....then

Doctor was called in from Hospital baby was delivered at home. Facilities are there in Hospital, think it is a momentary matter if it is an accident cannot be explained, it is seen that people happens many types ...it is bleeding profusely, then a mother may have acclamsia. Then ..dies. then there are many different detriments.....with the Doctor there are all types of facilities, he observes, observed. Then it is seen that leaving aside jumping and running about went there. No worries went to the Doctor (11) At Hospital. My daughter also born at Hospital. At Hospital facilities are more than home may be from home-doctor is there for predicament. For this. Doctor is there may be from here there in case of any predicament. Many people have many problems. Many face many problems. Delivering baby at home is difficult some or may not be or at the time of delivering baby many mother may have also detriment. Many a times pain prolongs and midwife is not available. Due to good midwife also detriment can happen to baby. Many times doesn't it happen like this? Detriment may occur---may be-at the time of delivering baby---can't get torn or so(14). Thinking for Hospital. Here Hospitals are good. Think there everything treatment and inspection are done properly. If delivered at home think there is a problem, and there if there is a problem they will take care. If delivered at home think there can be such a problem think of pain arises or baby is born placenta does not release or baby catches cold or something may happen to myself, these problem they will take care of . Problem of mother may occur. Placenta didn't release again Tangur Mangur may occur. Tangur means pain or many things happen. To baby's mother many thing happens. Allah is there to keep fine that's it. Tangur means a pain originating at the base of the Liver. Suddenly pricks. Thinking about hospital think they have given card giving anything, will deliver at hospital then asked as "will you deliver at home or hospital?" then I said if Allah gets things safely then it is all right if not in hospital (15). Hospital; because the baby had problem- the sisters said the baby couldn't be delivered normal, to see a lady Professor, it was then when we went to Dhaka, they said to deliver the baby at hospital. In this case, when it was 8 months old, I came to my 4th visit here, they said the baby has a big head, this baby. That baby had a bigger tummy and this baby has a bigger head. I mean in comparison to its body the head is slightly big. ICDDR,B, after going there sister did the ultra sonogram again, now the baby is 37 weeks old, and the head of it I mean that size improved a lot now(the younger baby). It's not big anymore. The head size is ok according to its age (16). After the miscarriage of two babies I decided that I would deliver the next baby at hospital. And, as now I am working in Nutrition sector, I understand many things. That's why I went to hospital. If one delivers her baby at hospital, there will be experienced doctors and nurses to assist the delivery. On the other hand, if one delivers her baby at home, midwives are there. But, they are ignorant. They are not trained properly. That's why I planned to deliver at hospital. There can be many types of problem. They can have longer nails, which are dirty sometimes. When they put their hands inside and touch the uterus with the dirty nails, those can harm the baby or the mother as those nails carry germs (19). Oh that time, I felt the labour pain whole day long but did not delivery. Then the time came of the Azan for Asar. After than the bladder loose the fluid but no pain. I was completely feeling well. Then we went to Khadergaon and there I felt again the pain. I didn't feel any pain when we started from our house and also in the road way. After reached there in Khadergaon , they provided Salain and then gave the delivery (20). . Many do not understand did you understand? Now the way Doctors understand. Midwives do not understand that. Serious damage occur for not understanding. After that placenta---happens.... What damage many do not understand. Suddenly if done anything or it bleeds that's it...Problem of Placenta is after baby is born the umbilical cord they cut doesn't mother have a damage then? For that reason mother has to go to Hospital (24). I am expecting at home but if there will be problem I have to go to hospital. Khadirgaon is nearer than Matlab. But there are some more benefit at Matlab than Khadirgaon. It means the services in Matlab are well. The doctors of Matlab take more care. If I feel any weakness, or sleeplessness or having trouble with the baby they support a lot. It may have problem with baby, feel weakness, mother may die, heave good doctors to take care of these. If baby is delivered by Allah, doctors will take care. It is seen .....(cannot understand). There are all kinds of facilities are available at Matlab. At Matlab the facilities are available. At home there is no doctor, there is no Kabiraj (village doctor). We will go to doctor if there problem even when there is no problem (26). In hospital- if anyone did not have more labor pain, then they gave medicine or injection for the actual labor pain or they took the process of Dhus'. They also took the 'Dhus' process for me. They supplied some hot water into the uterus and gave it out. It was comfortable during the delivery time. It was given me at the time of the first child. At the time of my first delivery- the fluid open for 5 days, but no actual labor pain. So, I went to hospital and they did Ultrasonogram and diagnosed. They found that there was no fluid in the womb. Then they send me to Chandpur. First time we went to chandpur Sadar. There was not any better treatment. The doctor was crazier to treat patients in their own clinic for the big money. Yes. We saw that people is dying there and to see that we went out of there. We fled away. The next day I felt a pain, and then I went to Khader Gaon Hospital. ICDDR,B hospital. I did not able to manage the pain. I was young that time and no experience. I shouted. They took me to Matlab with their awn boat. They called for better doctor. We were just reaching Matlab and my daughter was born. They just pull me and took into a bed and God blessed me and my daughter was born. My daughter was big in size, so it had to cut in a side (35). I hope it will be in hospital. As because, they will take better care at hospital. There people are expert and have their knowledge (36). There is more facility at the hospital. There is facility, because Nurses take care (37). I have a health card for that area. Through that health card I could get the facility from hospital for delivery (39). Someone has pain for 1-2 days, some one has pain last for 3 days, someone delivers immediately, for that if it happens according to date then it happens, that is will of Allah, if it doesn't happen then support of hospital is there. First daughter was born at hospital, at home they tried but it didn't deliver at home. There was pain, after that they are elderly people, they didn't do that, tried in home, after trying it didn't happen. After that, her father was not at home, her father came after some tie, then told me, my brother in law is telling let me take you to hospital, at night, probably it was 12 in the night. Then from there to k to Ashram (ICDDR,B Sub Center)then after at Ashram "Ashram Apa" had checked, after checking said that she had performed two deliveries, now it is not possible for me, then let me refer the patient to Matlab. Then referred to Matlab. Then went to Matlab, gave medicines, applied Saline, then around 3 o'clock my baby was born (17). Say some mother deliver their baby on onset of

pain, my all the babies were delivered thus with an exception. This baby was delivered in Hospital after 21/2 hours of onset of pain. Say some women suffer for 1~2 days. Someone who suffers from prolonged pain are taken to hospital. Blood pressure is measured, or administer required medicine of blood pressure, feed right, or advise to take a little rest, they say all these but do not give any thing (medication) for intensifying pain. If they cannot handle the case then send the patient to Chandpur or Matlab Hospital (40). In hospital, if delivered in house, it results in Eclampsia. May develop eclampsia or baby may also die, mother also may die. Mother also may die; again it may cause profuse bleeding. If delivered at hospital all these do not occur, bleeds less, that's it (8). If baby is delivered at home a lot of edict have to follow, do not allow to eat fish, do not allow to eat hot food, have to eat selectively. If delivered at hospital doesn't have to follow such edict, at hospital tells to eat everything. This proclamation is in home but in hospital there is none (14).

[Potential problems with delivery by a midwife] After the miscarriage of two babies I decided that I would deliver the next baby at hospital. And, as now I am working in Nutrition sector, I understand many things. That's why I went to hospital. If one delivers her baby at hospital, there will be experienced doctors and nurses to assist the delivery. On the other hand, if one delivers her baby at home, midwives are there. But, they are ignorant. They are not trained properly. That's why I planned to deliver at hospital. There can be many types of problem. They can have longer nails, which are dirty sometimes. When they put their hands inside and touch the uterus with the dirty nails, those can harm the baby or the mother as those nails carry germs (19). In the house the midwives cause a lot of pain and spoil. Considering this there is a Doctor in the Hospital. Many do not understand did you understand? Now the way Doctors understand. Midwives do not understand that. Serious damage occur for not understanding. After that placenta---happens....What damage many do not understand. Suddenly if done anything or it bleeds that's it.... Problem of Placenta is after baby is born the umbilical cord they cut doesn't mother have a damage then? For that reason mother has to go to Hospital. (24) I preferred the hospital. If it occurred in house that could be hassle of local nurse-mother. That created a problem. If it a normal delivery than its ok. But, if anything went to a wrong way, then they suggested getting other process. They tried to pull or created big space. Then anything can be happened-any injury. After then we had to go to Matlab. The process of local nurse-mother (Dhai) occurred some poison in this place also. The point of uterus. After then we had to shift to hospital. That poison made me sick. It is better to make a safe delivery at hospital (35). Take for example before onset of pain many insert hand and some opine the baby is healthy, someone says good, others starts pulling the baby amongst them, someone presses the belly, puts oil and many other things they do, that is why delivering baby at home is not desirable, I think hospital is a safe and better place for the purpose (7). My mother wanted to take me to the hospital. I said that my first baby was born at home so this one would also bear at home; I had this panic for hospitals. What if the doctors scold or something. But now I go to the hospital right away. Earlier I used to think that if the baby is born at home I wouldn't have to bear the scolding of the doctors. I mean I can be as I want. Now I realize that how risky it is to deliver at home...like the time I needed stitches, or the time was over 24 hours, then the sufferings I had, I couldn't even sit u, the bleeding was massive and my hand and feet became ice cold, I couldn't even stand straight. Then the doctor came and gave me injections and medicines. After that I was in good health. The part which tore is also completely fine. I only found it out when I went to the toilet. Then I went to the hospital, seeing a doctor, matter of a lot of money...it was a hassle. But if I went to the hospital on the first place everything required would've been taken care of. I and the baby both could've been ok. But the baby was healthy anyway, it didn't have any problem. Even this time I needed stitches but it was done from the hospital. We didn't have to worry about that at all. That's why I think that it's better to have the delivery done at hospital (16). On delivery at village house the midwife is there. Nail scratch from midwives causes tear, Blood passes profusely (8). Comes out through the passage, that place doesn't get spoiled, at home midwives spoils the passage. Doesn't the passage tear if healthy? For this reason many goes to hospital, doesn't stay at home. Assume many mother are like this that. And if one goes to hospital they deliver by applying incision in the passage. So that if the baby is born big---- (12). At Hospital it will be good may be bad at home. Some baby dies again at the time of delivery it tears off, many thing things happen (13). Now if a baby is delivered at home; it is observed that the mother gets Epilepsy, Gets torn in the lower, if it happens at hospital, they don't require the extra money (16). My first daughter was born here at home. I don't have such trouble. Later when the nurse took a look, it was found out that it's torn in the lower. When I was unable to hold the bowl movement this came into my mind, that my sister in law said that if it gets torn the bowl pressure is hard to control. Then a doctor came and said that yes...it is torn. The doctor was in the next door, he she used to work in a government hospital so we showed her, she said that its torn and she needs to be admitted in the hospital. Then I was admitted and it was sewed (16).

[Effect of education about delivery from antenatal care] My mother wanted to take me to the hospital. I said that my first baby was born at home so this one would also bear at home; I had this panic for hospitals. What if the doctors scold or something. But now I go to the hospital right away. Earlier I used to think that if the baby is born at home I wouldn't have to bear the scolding of the doctors. I mean I can be as I want. Now I realize that how risky it is to deliver at home...like the time I needed stitches, or the time was over 24 hours, then the sufferings I had, I couldn't even sit u, the bleeding was massive and my hand and feet became ice cold, I couldn't even stand straight. Then the doctor came and gave me injections and medicines. After that I was in good health. The part which tore is also completely fine. I only found it out when I went to the toilet. Then I went to the hospital, seeing a doctor, matter of a lot of money...it was a hassle. But if I went to the hospital on the first place everything required would've been taken care of. I and the baby both could've been ok. But the baby was healthy anyway, it didn't have any problem. Even this time I needed stitches but it was done from the hospital. We didn't have to worry about that at all. That's why I think that it's better to have the delivery done at hospital (16). After the miscarriage of two babies I decided that I would deliver the next baby at hospital. And, as now I am working in Nutrition sector, I understand many things. That's why I went to hospital.



If one delivers her baby at hospital, there will be experienced doctors and nurses to assist the delivery. On the other hand, if one delivers her baby at home, midwives are there. But, they are ignorant. They are not trained properly. That's why I planned to deliver at hospital. There can be many types of problem. They can have longer nails, which are dirty sometimes. When they put their hands inside and touch the uterus with the dirty nails, those can harm the baby or the mother as those nails carry germs (19). Say after listening at the training it was delivered at hospital. Otherwise would have stayed at home (12). At hospital...problem....it has many advantages....there is many good things....many of us (went to) hospitals. People from ICDDR,B also suggest us about the advantages of delivering the baby at hospital. So I will go to the hospital to deliver, it has many advantages. One of the advantage is they do not do anything that will cause risk for a mother. They are very careful while delivering the baby. They do many things....they do ultra sonogram....they look at the position of the mother. They take good care that is why hospital is better. Risk...is it better from that sense...it is the hospital ..that is why. I gave birth to the previous two baby at home all by myself...I did not feel any pain (9). What they teach, so that the mother remain healthy and baby also remain healthy. Remain healthy that is to say bleeding takes place on birth of a baby, in the village they do hold something, say about delivering a baby without a midwife. Have to go to hospital. At hospital less blood passes (8). That one suggested from CRL's Apa. We did not have money in our own. Anything would be happened by chance then we didn't manage the money. But if I went there they will manage everything. In our house we cannot manage anything in any accidental case as because we did not have money. But at hospital they can manage everything (20). Madam Hazera (a paramedic) advised 12 hours for delivery then a patient will be sent to hospital for delivery. These are all written in health card (40). What they will say? They will say hospital, delivering baby, for regularly going. For doing monthly ultra sonogram (17). They suggested as because I am weak and suggested to eat more and told about the delivery that it could be better to do it in Hospital (35). They also said the same thing, do not perform heavy work. At the time of delivery go to hospital. Not to deliver at home and even if deliver at home they gave this instrument (19). They taught us like--If I give birth in home then how to take care of baby, what is the procedure of delivery, if it is seen anything bad then need to go to hospital (36)

[Other people's opinion on hospital delivery] At home my family members, even my mother said that in the older times every baby used to be born at home, now a day everybody runs towards the hospital. Everything depends on the thought. We have to rush to the hospital because we think that we need to go there, nothing else. My mother says and my mother in law does. They say that their babies were born at home; they didn't need to go to the hospital. Now the new generation has new system. All they want to go is only the hospital. Now it is them who tell to go to the hospital first. Whenever the pain starts they say that go run to the hospital before it gets worse, no need to wait at home. I mean my mother didn't like to go to the hospital before. However she asked me to go to the hospital in case of my daughter, it was me who refused. But my baby boy and the recent girl were born in hospital (16). They say, as "we have not gone to hospital, what had happened to us? Did not we bear children? Exhorts like these. ---- (feebler voice) (7). She used to make quarrel with the doctors or whoever tried to help me. She said that all those people have made me spoilt. She has also given birth but she didn't receive any assistance. So, I also should not receive (18). I just told that I want to go to Khader Gaon but my husbands threaten me (20). My husband said not go to hospital. Doctors said for the betterment of baby and for me. My husband said, my wife will stay at home. I could not go the hospital. Doctors said for the betterment of baby and for me. My husband said, my wife will stay at home. Doctors are not required. I tried to make him understand. But he does not have any sense? (26)

## 2.3 Culture-specific rules

### 2.3.1 Do's

[Do's – Consuming nutritious food] Here there was a saying that if during pregnancy someone takes sweet during pregnancy. Say, sweet, keeps the brain cool. And they used to advise for taking milk. The baby would be fairer. Again they used advise for taking lesser amount of pepper (40). It's good. It's good to eat fruits (36). I maintain good work (meaning keep regulations). I didn't do heavy work. I took good food (meaning nutritious food). I took my food properly. I was pregnant so I took some good food (2). For remaining healthy, to take a little rest, take right food (6). Like everyone says you are pregnant, eat good food, and move around nicely, that you do not have any problem. Everything! Like vegetables, fruits, curry, rice, everything, a little extra quantity (7). Pomegranate (Anar, exotic) variety. Pomegranate (exotic) variety? Then Safeda (a local variety of water fruit). Take all these, earlier you did not take. Yes.(7) Good, so that it remains good and have proper Pushthi. Be nutritious, baby is fair, black. Good food are required to be taken for good health, that's it. (8). What I eat? Brigs Jack fruit, other fruits. It is said fruit keeps the baby healthy. Baby born is voluptuous. Is fatty. If, fruits are taken, that the baby remains healthy again remains good. Remains healthy, mother also remain in good state. (8). Just sleep, eat, does that what else should I do? (11) What they will say about eating, do they give any food? They say that eat this-drink milk-eat egg (17). I ate vegetables, such as: some type of spinach-kachu (aram), Lal and Pui etc. To get nutrition. Nutritious food makes blood. Anemia goes away. I just prayed to Allah so that the baby become healthier and took my food regularly. I would pray to stay well. I took food regularly. I ate several kinds foods now and then. I prayed to Allah and took my food regularly I was mainly keen about my feeding and took food in a short

interval, ate apple grape and other foods. Say fruits like apple. CRL's Apa came in every month. And doctor suggested to eat good food, milk, egg and not do any heavy work (25). The doctors said to eat good food, egg, milk, apple, orange and several type of good food (26). Better something. I ate the nutritious food. Yes I tried. Sometime ate fruits. Sometime ate grape, milk, eggs, but very few time. It's not so easy because we are in a joint family. Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer. I tried to eat more for my child's safety. Now I also tried to eat fruits (27). What can I do? We don't have money. I have to eat nutritious food, but how could I manage money? They suggested eating vegetables and Spinach and not to go outside at midday and also suggested to be a good woman. They suggested eating milk, egg. They suggested taking huge sharbat (a sweet drink) (35). Basically everybody tell me to eat good food, and also to go to hospital. Everybody tell about hospital. Not so much. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (36) during the delivery, even after the delivery they have asked me to get nutritious food (37). Take food, this much they used to say (39). I maintain good work (meaning keep regulations). I didn't do heavy work. I took good food (meaning nutritious food). I took my food properly. I was pregnant so I took some good food. Like milk, eggs and sometimes fruits. Apples, (grapes). When my date over (giving birth time passed) then I went hospital. Before I gave the birth I took fruits (41). I used to drink plenty of water, I didn't do any heavy work, I ate plenty of green leafy vegetables, eggs, milk and fruits etc. That I ate fruits more than other time. Fruits even eaten in other times ate a little less. During that period ate a little more. Ate more considering own physique again baby would be healthy. I was of a little frail health, I myself will get a little energy. (19). Here there was a saying that if during pregnancy someone takes sweet during pregnancy -----Brain of the fetus would have sharpened (6) What would result on taking milk? The baby would be fairer (6). Didn't take? Eaten sour things, ate tamarind, ate aitta Kala (a variety of banana), again ate aida heida (this and that) (17). This sweet Gourd. Then potato, good fish, leafy vegetables, tells to eat all (24).

[Move carefully] That one has to go around correctly. Has to move, has to eat. Has to go about rightly. For baby to remain in good condition (8). They used to say. Remain vigilant, you yourself go about vigilantly (39). Carefully means, I must move carefully, so that my baby in my womb can remain in place or if Allah allows the delivery then He allows me to have a successful delivery. To remain careful, for example; there are many women who move in different way, aren't there? They run, runs fast, do many things... If I move then it may create problem for my child. So, they advise me to move cautiously. All Muslims follow it. I want to know. Any pregnant woman should follow the rule, when to move, how to move and she has to maintain the timing also. Starting from becoming pregnant. One must hide her head with cloth and must be more cautious about her movement (4). Like everyone says you are pregnant, eat good food, and move around nicely, that you do not have any problem. Nicely! Like not going to any place in the evening, do not undertake heavy works etc they say. Not going, many in the village advice move carefully, s many in the village do not know though, but move carefully in the evening, that you do not face any problem. It may be a miscarriage or may be afflicted with wind (7). Tells to go about nicely, meaning slowly, not displaying hurriedness. That do not run about. Harm may occur to my baby (13) This most of them say tat now do you say to go to them, telling to talk to them, about various matter they say to move around correctly, ask to eat. Move around means walking-move correctly, eat adequately (17).

[Taking rest] They also said to take much rest. I tried a little after taking meal and I take rest for half an hour (9). Just sleep, eat, does that what else should I do? (11) To take rest and to try to take more food. To protect my child's well-being, I took rest. They tell me because of my well-being. Yes, for my well-being and also for my child's well-being (1). Most of the time my husband told me to take rest (2). I take a little rest whenever it is possible. For remaining healthy, to take a little rest, take right food (6). They are giving medicine, I am taking them, sleeping for 1 to 2 hours, so that the fetus remain healthy (7). Used to tell to be at rest (10). Advice is given just on going to hospital. Have to eat properly, have to take rest timely. After that if rest is taken then comfort for mother comfort for baby, or else pressure may fall on baby (14). Such as I can't go out in the afternoons, can't walk that much and have to lie down. About working they used to say that I cannot take heavy load, but I can do light chores and at least have to rest for 2 hours a day (16). Yes gave, said do not perform any heavy work, be at rest, don't go anywhere, otherwise you have passed a lot of trouble, those were told by elders. If, on walking more I may have any impairment that's why they wanted betterment of me. Neighbors told (19). Nothing more, if I do not feel good I go to bed. I go to bed daily; usually everyday when I do not feel good; I go to bed at least for one time in a day (36). To protect my child's well-being, I took rest and I didn't do any work which needs more energy. He told me to take some rest. These things he told me. They also forbid me to do heavy work. To take rest and to try to take more food. Previously if I took meals three times per day, now they tell me 4-5 times. They recommended these things (38). I take a little rest whenever it is possible (40). They (midwives and delivery assistants) advised me to remain and work cautiously. They also asked me to take rest at least 5-10 min (5). Slept in the day (15). They said not to lift heavy things. I should take rest for one hour. I should not do the work where force is required (26). They told me to take some rest. Some sort of lie down (41)

[Do's – others] She cannot go to any bad places. Sometimes one can go in the morning. On must keep her clean (4). Again sometimes recite the holy Quran Sharif, offer Namaz, read books. Benefit, think is one however mother does an offspring does the same after coming to world, this good will happen. offspring will conduct the same (11). They advise me to contact with doctors. If I do so then I will have treatment which will help me to remain healthy (4). To go to hospital on feeling otherwise. No, only if I feel bad. On feeling a little bad symptom, one has to go to the hospital. Physical tiredness, weakness, all these are

manifested during pregnancy, when those symptoms are observed the mother is advised for hospitalization. For going to hospital, if I go to hospital, I remain healthy, fetus will remain healthy, get good treatment (6). Everything I do for the health of baby, try to eat properly, go to hospital twice a month, carry out checking whether everything is all right or not (14). As my previous two babies were miscarriage I felt tension this time. I took rest all the time bearing in mind if this time I had miscarriage! I used to go ICDDR,B, for regular check-up. They were also caring for me as I had two miscarriages. Otherwise if had another! That's why they checked me frequently whether there was any problem or not (19). My husband told me to go to hospital (27). Basically everybody tell me to eat good food, and also to go to hospital. Everybody tell about hospital (36).

### ***2.3.2 Don'ts***

[Heavy work] That not to engage in more work, heavy work not to undertake heavy work, tells many talks (11). They (CRL apa) also tell not to do heavy work, tells to take rest (13). Now the time that has come, in that have to say eat this do that, with slight pain in the abdomen go to hospital. Heard before with baby in the womb mother in laws used to do everything, Dheki kut ta, gave attention to paddy in this baby used to born. Now if baby is I the womb cannot touch any heavy thing (18). Like not going to any place in the evening, do not undertake heavy works etc they say (7). So that I----(feeble voice) do not work with heavy thing, go about good. Mother in law says, Ja also says (8). I avoid heavy workload. I follow the rules a little bit. I do not do any heavy work or lift heavy weight I do not carry heavy water jar. This time there is no heavy work and there is no much work. I did not have any other thought in my mind (9). I did not do heavy work. I do not have any heavy work so I also did not do. They have also told, went and what else that do not perform heavy work, be at rest. What for this did not tell anything, that be at rest, do not perform heavy work (10). There will be no harm. Take, followed did not perform heavy work. Heavy works and then after that (giggle) didn't wash clothing. That Ajmeri Apa used to say, then mother said, aunt said, everyone said, then people of homestead also said that do little heavy chores, or job requiring more (12). Do not attend heavy chores (13). May be do not tell at this time know that lifting a heavy thing is restricted, cannot lift pitcher, load (14). Say do not do anything like do not do heavy work. Do not do heavy work so that it remains healthy remain good that's all. What else think do not perform any heavy work, in this condition do not do any heavy work. Didn't do any heavy work. Didn't pick anything, half of the family work were done by mother in law or myself, not much of pitcher filled, many thing such meant (15). About working they used to say that I cannot take heavy load, but I can do light chores and at least have to rest for 2 hours a day (16). Customarily do not lift anything heavy. Do not carry anything heavy or carry water with bucket/pails. We do not have heavy work. Like this in the morning one time cook. This cooking only. Heavy work we do have none. Only small quantity of rice, rinse of water, take small quantity of rice, eat this much finished. There is no other heavy work (17). Says, not to eat outside stuff. Not to lift pitcher of water. Not to lift heavy item (18). I used to drink plenty of water, I didn't do any heavy work, I ate plenty of green leafy vegetables, eggs, milk and fruits etc. Any heavy work, for example, I kept away myself from fetching water, sweeping home with mud, or bringing woods for cooking etc. I didn't sweep home with mud. They said do not perform any heavy work, be at rest, don't go anywhere, otherwise you have passed a lot of trouble, those were told by elders (19). She discouraged me to work a lot and any of a heavy work and many a time suggested me not to lift any heavy thing during the pregnancy period. My mother-in-law did not allow me to do any heavy work. She is quite good. They suggested about my domestic works; did not lift heavy thing or pitcher: only worked small in quantity (Alpa- Swalpa). They told that heavy work (during pregnancy) can be bad for me. Those senior and eldest persons (who suggested me); they can only know that why that would be bad or what type of (20). Tells about work. After birth of baby till three months not to do heavy work, now is 9th month.....isn't time nearing. Now not to do work requiring force. not to carry pitcher. This they say not to do work of force, so that I remain healthy (24). He suggested not to lift any heavy thing and did not permit to work lot. I did not lift pitcher, heavy pail, a sack of paddy. It may have problem to my fetus. CRL's Apa came in every month. And doctor suggested to eat good food, milk, egg and not do any heavy work (25). They said not to lift heavy things. I should take rest for one hour. I should not do the work where force is required. The heavy jar. I should not do the work where I feel weak (26). He (husband) told me not to do that type work which is related with weight lifting (27). My mother-in-law did not allow me to do any heavy work. She is quite good (36). I try to avoid the hard and heavy work. I am not taking any work load. You can also understand, we are only two persons in our family. So there is no problem. If one maintains can be benefited out of those. All says that, one cannot do the heavy works while she is pregnant. Doctors say, everyone says (37). To protect my child's well-being, I took rest and I didn't do any work which needs more energy. I did not do any heavy work. They just forbade me to do heavy work. They said do not do heavy work and try to do light work. For my well-being and my child's well-being, they forbade me to do heavy work. He told me to take more foods and also forbade me to do heavy work. Doctors and nurses also forbid me to do heavy work. To take rest and to try to take more food. Previously if I took meals three times per day, now they tell me 4-5 times. They recommended these things (38). They asked me not to pull the vessel or not to do any heavy work. My mother-in-law often quarrels with them. Neighbors forbid me to pull heavy vessels. They forbid me the dangerous works to do. Say for example; I used to dig and bring soil, make-over the floor with mud, wash big cookers. They advised me; they said me, "those works will be difficult for you. Don't do these during your pregnancy. As your delivery date is near-by". Different person gave me different ideas (39). I do not do the work which is tiring, only do easier jobs. I do not work heavy ones (40). I maintain good work (meaning keep regulations). I didn't do heavy work. I took good food (meaning nutritious food). It means I did not do heavy work (41). For my well-being and my child's well-being, they forbade me to do heavy work. To protect my child's well-being, I took rest and I didn't do any work which needs more energy (1).

[Potential harm of heavy work(baby)] Say heavy work (feeble-laughing) said to be in rest for 2 hours, said work will harm the baby (12). Like this may used to say, means doctors used to tell also myself know, outsiders also used to say do not perform heavy work, forbade to perform heavy work that's it. Problem may occur due to performing heavy work, problem to baby will occur, used to tell problem to myself will occur. Used to tell to be at rest (10). It may harmful for the fetus, baby may be placed aside, mother gets pain, mother cannot stand up. If she works heavy work, baby can get out from uterus. Baby's hand or foot may come outside from the uterus (26). They forbid me the dangerous works to do (5). On performing heavy work it is said that baby comes down then problem occur. Causes difficulty. It may cause difficulty in movement if baby sides down and from all consideration. In sitting and standing, disadvantage from all sides (10). These are said, as these may cause damage to the fetus. That is for keeping the fetus and mother in good stride (7). Work less, so that your baby is not harmed. Accident do not occur, Fatality, again fall off due to vertigo (8). He (husband) suggested not to lift any heavy thing and did not permit to work lot. I did not lift pitcher, heavy pail, a sack of paddy. It may have problem to my fetus. The point of womb may come down and harmed fetus. It may break the chest of baby. Say, it may get a hit/pressure (25). May be problem may be there pressure may build up. Baby may face problem (14). If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work (38). Because heavy work will cause harm to Uterus. Damage to own health. If you have more babies, the uterus enlarges, the wall becomes thinner, and it may rupture on applying pressure. She had picked a heavy pitcher. There are elders, who advise not to perform heavy work or carry anything heavy. Bah! One also feels bad, when I perform a heavy work, I feel tired (40).

[Potential harm of heavy work(mother)] Like this may used to say, means doctors used to tell also myself know, outsiders also used to say do not perform heavy work, forbade to perform heavy work that's it. Problem may occur due to performing heavy work, problem to baby will occur, used to tell problem to myself will occur. Used to tell to be at rest. On performing heavy work it is said that baby comes down then problem occur. Causes difficulty. May cause or difficulty in movement if baby sides down and from all consideration. In sitting and standing, disadvantage from all sides. (10). It may harmful for the fetus, baby may be placed aside, mother gets pain, mother cannot stand up. If she works heavy work, baby can get out from uterus. Baby's hand or foot may come outside from the uterus (26). Body ache will happen, can fall ill, these are apprehended. I am talking of husband (40). : If I do heavy work, child can be weak and it can problem also. Many (mothers) have problem in backbone and bleeding if they do heavy work (38). Because heavy work will cause harm to Uterus. Damage to own health. If you have more babies, the uterus enlarges, the wall becomes thinner, and it may rupture on applying pressure (40). What else? That's it. Let me suffer not my baby, again I also don't want to be harmed, again I have to fetch water for cooking. Doesn't it feel fatigue to me? I feel fatigued (8). Ha, Ha, she had picked a heavy pitcher. There are elders, who advise not to perform heavy work or carry anything heavy. Bah! One also feels bad, when I perform a heavy work, I feel tired (40).

[Kinds of heavy work] Heavy task, say, the heavy pitcher, fetching water with large pitcher. Take as an example; I can lift 1 Kg, 1.5 Kg weighing rice Haree. But cannot lift Haree of 5/10 Kg rice (7). I do not carry heavy water jar (9). Heavy works and then after that (giggle) didn't wash clothing (12). Like lifting a baby or lifting firewood, a heavy pitcher lifting from here to there. Wash lighter clothe, heavy cloth blanket do not wash, Jas do. About cooking! can lift light utensils, it becomes difficult to lift a utensil of 2~3 Kg rice. (13). Water pitcher, heavy load cannot be lifted on head. May be do not tell at this time know that lifting a heavy thing is restricted, cannot lift pitcher, load. (14). Say do not fill up pitcher, do not oil paddy. Do not do other jobs, I have daughter she does all, mother in law does. Handling Paddy or if Pitcher is taken. Difficult think cannot handle anything heavy (15). Such as bringing water from the pond, working at paddy fields, dragging paddy sacks etc. as we have a joint family, we require 4 kg rice, which is heave...so these sorts are heavy work. But cooking, cleaning, making bed, sweeping these are light work. My mother and their generation used to work all day long unless the baby was born, used to pedal out the paddy. But in case of us pedaling is strictly prohibited, we are not even allowed to carry 2 KG water. The doctors forbid to do heavy works. But the older generation they say that they worked a lot and didn't have any problems (16). Customarily do not lift anything heavy. Do not carry anything heavy or carry water with bucket/pails. We Do not have heavy work. Like this in the morning one time cook. This cooking only. Only small quantity of rice, rinse of water, take small quantity of rice, eat this much finished. There is no other heavy work (17). Any heavy work, for example, I kept away myself from fetching water, sweeping home with mud, or bringing woods for cooking etc. I didn't sweep home with mud (19). Yes gave, said do not perform any heavy work, be at rest, don't go anywhere, otherwise you have passed a lot of trouble, those were told by elders. If, on walking more I may have any impairment that's why they wanted betterment of me. Neighbors told (19)I did not lift pitcher, heavy pail, a sack of paddy (25). They said not to lift heavy things. I should take rest for one hour. I should not do the work where force is required. I should not do the work where I feel weak. Lift up of big rice pot is also a heavy work. In this situation doing this work, is not a tuff work? (26). I made blunder as I worked. I did hard job. I pulled heavy potteries, heavy cooker. Neighbors forbid me to pull heavy vessels. They asked me not to pull the vessel or not to do any heavy work. They forbid me the dangerous works to do. They forbade me to any hard work; any work that is related to cultivation, like husking the wheat and also not to sit giving pressure. I used to dig and bring soil, make-over the floor with mud, wash big cookers. They advised me; they said me, "those works will be difficult for you. Don't do these during your pregnancy. As your delivery date is near-by". Different person gave me different ideas (39). Uterus! Problem is that my menstruation cycle is not proper. And my empty belly aches. These all happens when I sweep the yard, go to daughter's school and walk briskly (40).

[Still need to do heavy work]

The household work is most difficult to me. I could not lift up and get down heavy thing. Whenever I can I do but I leave other time. I don't get strength to do any work (26). My mother in law doesn't understand this. Now I am telling mother I am not feeling well now, I will do it later then she doesn't like it very much. How, I do not do the job then, do the job later when I feel better. She doesn't want to do any job, wants I do all works. This is not wanted, now she wants I carry the heavy pitcher, large pitcher, I will bring those, do everything myself (7). who else to do this work? I do all the work. I use small rice pot what conveniently for me. Though there is no other way, I will have to do. No other else in this family to do this work. One day someone comes and do my work. Second day he/she comes but what about the other days? (26) Apa, if I don't work there will be quarrel. I made blunder as I worked. I did hard job. I pulled heavy potteries, heavy cooker. If I would have said to my mother-in-law that doctor had forbidden me to do any heavy work, then she said that I had lied because I wanted her to work all those. I had taken rest for 10 min after cook. If I had done this even I had to hear that I lay on bed. I didn't do any work. I had to hear lots of words regarding my maternal home also. Just to avoid those I got up from bed. People said because if I pulled heavy vessels then it could harm the position of my baby. It could get hurt or have breathing problem.. But, I had to work as my mother-in-law didn't let me to avoid these harmful things. She wanted me to work (39). What shall I do, actually there is nothing that I can do, in the house there is no other person, I have to take care of my own chore (13). She (mother-in-law) cannot do any work---we have to do all household tasks. She cannot do any work (17).

[Family support – heavy work]

He resists from working, himself does or obstructs from me doing a job, tells to eat something. Daughter works for homestead. Say husband does the bed or arranges the interior. Does this, if required, fixing the mosquito net and taking kids for showering (this is done by him) (40). Whatever is good that is said by my Husband. Don't you see allows me to work less. After this fills pitcher and fetches that. Does whatever he can. My Husband takes, who else would take (11). Like used to draw water by pails, fetched water with bucket. He (husband) used to stay at home, then clothing, if there were enough clothing washed those (12). Now I observe he does a little. What I cannot do does that. Sweeps the homestead, gives bed cushion in the Sun. Attends the heavy work. Brings food items (13). Heavy work that I could not do those he did (19). Sometimes he helps in the household works (37). Used to help. When he used to be at home, I could not fetch 1 or 2 pitcher of water, pitcher----(respondent starts speaking). Fetched. Used to do this (39). My husband helped me also. For example he filled pitcher (by water). He took the rice pot (the dish where rice cooked). Sometimes I did not clean my house by broom then he did it (41). My daughter does. Do not lift water in large pitcher, bring water in small bucket. And small family that's why not much of problem. What if minor does all chores, brings water, sweep the floor, cleans the plate. (18). Didn't pick anything, half of the family work were done by mother in law or myself, not much of pitcher filled, many thing such meant. Do not do other jobs, I have daughter she does all, mother in law does (15). Like- other members do heavy works and I do some light works like –cooking (36). Wash lighter clothe, heavy cloth blanket do not wash, Ja(sister-in-law)s do (13).

[Food restriction]

That if chili is taken then the baby will be an angry one. Long before these is to be followed (sound diminish) (6). Pineapple is not eaten when baby is in womb. Elders restricts that's why didn't eat. Tells will be problem for baby. I do not know correctly. Abortion takes place. (hey what problem occur?) dies that's it (10). If baby is delivered at home a lot of edict have to follow, do not allow to eat fish, do not allow to eat hot food, have to eat selectively. If delivered at hospital doesn't have to follow such edict, at hospital tells to eat everything. This proclamation is in home but in hospital there is none (14). I followed such rules in case of fishes, what do you call it...Mrigel Fish. Mrigel. I don't eat that fish anymore. It is said that it causes Epilepsy. (Laughter). I mean this is a village thing...everyone says... That's why I don't eat anymore. I ate it one day by mistake. (Laughter). nothing is forbidden among fruits. It's the same at my parent's house as well. My mother doesn't let me eat either (16). Didn't eat Pineapple. Harm occurs if eaten for that. Many said Pineapple cannot be eaten after that I didn't eat. On eating that the baby may be blemished that's why I didn't eat. It was said once I didn't eat out of fear. Heard many days back in childhood that if baby is in the womb than Pineapple cannot be eaten, this I have kept in my mind (19). I did not eat pineapples. My husband did not take it, so I did not eat. Not any restriction. But after giving birth pineapple should be prohibited. Pineapple is a poison. New born baby depend on mother's breast. How could the mother eat pine-apple? As because if I eat pineapple and my baby takes my milk which will be changed as a poison. Or the milk served after two or three hours and that's why I don't eat pineapple. (20). Do not follow? Certainly follow the edict. Like in pregnancy Pineapple cannot be eaten. Hear that will harm as is said. Is detrimental. Vomits. Is not problem physically feel unsound. (24). I ate papaya sometimes, but didn't eat pineapple. I do not eat pineapple usually (25). Yes, I do not take pineapple. It was not restricted at other time but should be careful at pregnancy period. We must be careful whenever we eat. Other time we can eat but there is a way. If we take when the baby is in womb, .....pregnant women cannot take that. God forbid, any baby in the womb may die for eating pineapple. It may die. (26) I did not eat pineapple. Allah gives me a child that is son or daughter that's not more important. But I tried to avoid the food that could be harmful, such as Tamarind. It is too much sour. It could be made dysentery. I also avoid the chilli, because I had gastric problem. I did not maintain such restriction. Again someone suggested not eating coconut, it made eyes white. But I did not maintain and ate everything. But actually it did not happen - my child eyes are nice enough (27). Many people did not eat pine apple. It is harmful. It is harmful for the fetus. Everything can take except pineapple (36). There is nothing forbidden, only pineapple. One can't eat pineapple during pregnancy. If one eats pineapple during pregnancy there can be the abortion of the baby (37). Chilli, taking chilli would harm the fetus Yes Becomes less angry, if you take chilli, the baby becomes stubborn type, all these. (40). I

didn't go outside at evening. I slept for a while in that room. Sometimes I didn't touch any fish right away after bringing from bazaar (39).

[No restrictions on food items] No...No...No. You can take every type of food. I don't know. Yes, I can take everything. I can't think of anything forbidden (1). I could take which I want... They told me to take anything else which I wish. (2). If, I do not feel like I do not take a food item but otherwise no body advises to the contrary (6). No, nothing is eaten separately. There is no such food, eat all food. Don't eat such, don't think at all that don't eat that, eat whichever can. No, there is not these, whatever taste feels eat that. Whatever feels good to me eat (13). They said that I can eat everything. There is no restriction. In the old times the mother couldn't eat fish for a week. They say that it causes skin problem for the baby. They say that baby gets skin rash I the mother eats fish. They say if you eat fish those rashes would become worse and won't go easily. But I ate fish and my baby is fine by the way. I don't follow this anymore but I used to. (Laughter). I don't follow it now because I don't follow any restrictions about food anymore. I eat everything (16).

[Restriction of going out] I did, I didn't go far from outside, or anywhere. I had to maintain a lot. I didn't go far and also didn't go anywhere in the early morning and in night. Usually I tried to stay in my own room. People often took safe in the twilight (late evening time). The senior family members suggested keeping in safe place (Baicha) (20). My Husband also restricts. My Husband restricts for remaining in veils. Those walking about I didn't go for those (inaudible) that way (11) Gave, said do not perform any heavy work, be at rest, don't go anywhere, otherwise you have passed a lot of trouble, those were told by elders. If, on walking more I may have any impairment that's why they wanted betterment of me. Neighbors told. Used to tell because otherwise there may be detriment if went out alone (19). Elder Ja's this condition....now in this condition going anywhere from home is restricted. Not to go anywhere. Will not detriment occur? So that I do not go to any place in transport. Do not go in any vehicle. It will be detrimental if go. Detriment means the baby will get injury, problem will be in my body. Apa one thing is there that is many person follow the time hour most of the time. Doesn't go to certain places as long as the baby is in the womb. One is that you have been restricted to undertake journey (24). I do not go anywhere. Outside of the home, at night. I do not go anywhere so much. For the betterment, to avoid any kind of harm (36). Mother-in-law prohibited me to go. I could fall down. I had some pressure (meaning hypertension). If I fell down, damage of child (meaning miscarriage) could happen (41). I did not go here and there that much. I did not take any tension. I took my food properly. During my pregnancy I followed some rules. I told you that they (family) did not permit me to go anywhere. I did not go (2). She cannot roam around (4). Say for example, going to various places, far away fields, going out in the afternoon are forbidden (8). Usually we do not go outside. There is a pond near our house. So we are not supposed to go around. Elders say, we should not go outside. (9) . Didn't go anywhere, how I will follow the Norm, I am in the room, think room and the yard (11) What would have happened right? Just like that do not go any place, go nowhere. Would not let me go. In this condition do not go any place, anything ill-omened will happen. Or isn't there didn't allow to go to a particular house, didn't allow to do anything (17). She (my mother) said not to go out, walk slowly and little, not to go in front of others. It is a question of shamefulness. Because there is many male people there. It is a matter of shamefulness. For this she said to walk less (9). Like what? Now think, I did not go to many people, didn't walk, may be stay near house. Like take the case I do not have habit, isn't there I go somewhere and pass away sometime gossiping, talked, go around whole house yard, doesn't have this habit (11).

## **2.4 Family's influence**

[Family members care pregnant women] My husband, parents, father in law. They look for whether I take food correctly, whether I take rest adequately. Take care. He (husband) takes good care (7). My mother in law and my mother think about me. My mother is anxious about me more than my mother in law (9).

### ***2.4.1 Role of family members***

#### **2.4.1.1 Common roles of husbands and mothers-in-law**

[Common roles of husband and mother-in-law, providing advice on food consumption] Take care. He (husband) takes good care. Inquires about my food taking. I reply that I have taken. Taking good care of kitchen. Urges for eating more (7). My husband said to take supplementary good like milk, egg (9). Husband used to bring, eat this eat that (10). Husband also tells like this. That if eating is late to eat early thereafter to sleep if I feel bad (11). Like he went to market he doesn't return empty handed he will bring one or the other thing. My husband wants the more as much as I can eat , it will be beneficial. For this he means more food----what I can eat is his subject. The item he will like will bring (14). (Husband) says. Eat properly, eat regularly. Brings. Eat this-eat that. That, fruits brings. Brings good items from bazaar when comes home (19). He

said for eating. Benefit will occur if eaten. Hunger will be fed away. Will remain healthy (24). Well my husband, he suggested the better food, which one will be good for my health, looked after me, cared about my safety. He always tensed for me and called me over phone. My brother-in-law went there and he said that he will send money with other people. He asked about my feeding, and suggested to eat eggs and again sent fruits (25). Which I liked to eat at that time he gave me to eat - fruits, eggs and milk (27). Their father (husband) is also shouting (caring for). He brings something...for my eating. He is not angry (shouting), but (he is saying) I need to eat more. If I am able to eat more, I will be fine and my child will be also fine. Will be good. For that reason, my husband did this. He told me to take more foods and also forbade me to do heavy work (38). He resists from working, himself does or obstructs from me doing a job, tells to eat something. Tells to take this or that food and to eat more. Say he brings a jack Fruit, says take more, purchases milk and asks to take (40). He said take food every day what you wish. Sometimes my husband made "shorbot"(water with sugar and add some juice like lime). that was it nothing else. If my sister-in-laws or your mother-in-law cooked any good food they gave me (41)

[Common roles of husband and mother-in-law, providing advice on work load]

Take care. He (husband) takes good care. Also say to be comfortable the way I feel it. Do that work you can perform easily perform that and one is difficult do not do that (7). Don't you see allows me to work less. After this fills pitcher and fetches that. Does whatever he can (11). (Husband) used to do. Like used to draw water by pails, fetched water with bucket Used to stay at home, then clothing, if there were enough clothing washed those. Didn't do earlier (12) Now I observe he does a little. What I cannot do does that. Sweeps the homestead, gives bed cushion in the Sun? Attends the heavy work. Brings food items (13). He also said keep Apa near you, Apa will take care of you, attend to less household chores, do not perform heavy work. Heavy work that I could not do those he did (19). He suggested not to lift any heavy thing and did not permit to work lot (25). He told me not to do that type work which is related with weight lifting (27). He told me to take more foods and also forbade me to do heavy work (38). He also advised me to work as much I can. But, he didn't stay at home all time. So, he couldn't see me (39). He resists from working, himself does or obstructs from me doing a job, tells to eat something. Obstructs me from doing any work (40). Mother in law says, Ja also says. So that I----(feeble voice) do not work with heavy thing, go about good (8). My mother- in- law did not allow me to do any heavy work. She is quite good (20). My mother- in- law did not allow me to do any heavy work. She is quite good (36).

[Common roles of husband and mother-in-law, providing advice on taking rest]

My husband, parents, father in law. They look for whether I take food correctly, whether I take rest adequately (7). He told me to take some rest. These things he told me (38). Then husband used to insist to be in rest, used say, used to give (39).

[Common role – provide advice on cultural belief]

She (mother-in-law) said not to go out, walk slowly and little, not to go in front of others. Elders say, we should not go outside (9). My husband follows the times that's why has to follow (14). (Mother-in-law) Says. Not to go anywhere in the evening, not to go anywhere in the noon (15). Sometimes when I intend to go out around 12 or 1 o'clock, they don't allow me to go. What can I do, I have to listen to them anyway. I wait a while and pass that time and go after that (16). My husband and neighbors advised to go to medicant. I didn't believe, my husband forced. Brought him home and got me treated. They said, my husband said that, "she certainly has any problem. Give her tabiz" (19). I go outside with someone. My husband. I feel strength if someone with me (35). The elders tell, everyone tell, neighbors, father in law mother in law that if stomach is empty then baby born is large and if stomach is full then the baby is small (13). What would have happened right? Just like that do not go any place, go nowhere. That now it is noon time, it is seen that mother in law would not let me go. Would not let me go. In this condition do not go any place, anything ill-omened will happen. Or isn't there didn't allow to go to a particular house, didn't allow to do anything. Then could not go all the places according to my desire, permission of elderly is also required, their daughter in law, the way they say have to remain (17). My mother in law told not to go outside (27). Mother-in-law used to say about wind. On finishing all jobs, used to say-----Did I tell you to do that. I site you an example. Say I go to pond in the evening (39). During my pregnancy I followed some rules. I told you that they (family) did not permit me to go anywhere. I did not go. Mother-in-law prohibited me to go. I could fall down. I had some pressure (meaning hypertension). If I fell down, damage of child (meaning miscarriage) could happen. There is some Alga-Talga. It could catch me. Villagers told me these types of so many things (41). My sister-in-laws father gave this amulet, he is an Ayurvedic physician. He gave this to keep away all the demonic energy (laughter). I dint believe in this amulets before. Now I have to otherwise they scold a lot. If I don't use it they would scold. That's why I have to. If I don't wear it they scold saying that I don't listen to the elders (16). That to mother-in-law said for going, eat, this I have listened to them, ate, went (8). My Husband restricts for remaining in veils. This is for all times. Those walking about I didn't go for those (inaudible) that way (11).

[Common roles of husband and mother-in-law, providing advice on taking supplements]

That to mother-in-law said for going, eat, his I have listened to them, ate, went (8). If he (husband) orders then will eat (Pushiti). (He) allowed to take (11). (Husband) Allowed (me) to go. Then husband also said "eat", "eat". Say, listened to my husband, again they also said (12). (Mother-in-law) Used to tell go, eat and come back, eating this will benefit you. Opined good. Used to say it is coming new will be good. Go eat and come back. (13). My husband viewed this positively was enthusiastic to feed me Pushithi. Consider the well being of baby, considering own health ate. Husband is angry. I had to eat what he wanted. Husband wished more that's why I used to eat Pushithi. He used to think that after eating I will remain healthy, it was his desire how to keep me

healthy (14). (Family members) Tell to eat. If not eaten admonish me. If I do not eat then “ why don’t eat”? They have given for benefit. “Didn’t give for detriment. Eat”. Mother in law says. Or his father so long he was alive said. Husband said to eat. They say to eat. The direction in which ICDDRDB’s sub centre is located, tell me to go, go to doctors. They never ever restricted me from going (17). They advised to eat. It is better to eat Pushiti and it helped baby to be strong (36). How I could consume Pushiti, they (family members) told....When they (Pushiti Apa) gave me oil, mixed grinded “Dal”, and “Gur” (juice or date-palm in the crystallized form), When I took it to home, my mother-in-law told me to add some bananas and milk. My mother-in-law told that and my husband also told that. I followed both of them (38). Husband says for taking (40). If they made any mischief I did not take. They (family) also told me “take”. They told me “they have given you pushti (nutrition) . Eat it.” so all people comments were same. so what could I do(means - that’s why I took it) (41). My family members said, why don’t you eat it? You take it. Do not throw it away. My mother in law (9). Mother-in-law view it positively. Tells eat. If they give what is your problem in eating? If it benefits you if Doctors give you take what is the problem? (Husband) Allowed to eat thought that “it is good for you, on eating this benefit will occur, you eat, what is the problem.” (15) She told that it is better for health. They served it at your house. It help you to be strong. She expressed positive view. Hauri (mother-in-law) insisted me to go (for Pushiti) (36). You thing is not it troubling in going and coming. Think that do not we go to a place frequently, as wife of Huzur (religious Leader) near the house (feebler voice) stay. This was said by my Husband as heard. Later he said then went. When debarred then did not go. it may be on any day work was there or had more of commitment everyone together in the family.....for that think said hang around don’t go today go tomorrow, like this (11). Used to go after getting permission from mother-in-law. Despite my hundreds of job I was allowed to go else my husband used to be angry. everybody is afraid of my husband. (14)

[Common roles – permitting to seek hospitals]

On my husband, whatever he will say that will happen. If he says I must be taken to hospital now then will be taken to hospital (14). Assume if husband stay outside even then everything goes according to him. What says, went to hospital, was afraid, baby is physically weak, baby cannot eat properly, so he said to do the way they say. However advantageous to them and good to them. How they tell you do that way, you listen to them (15). When this baby of mine was born I wanted to go to Dhaka but my husband said that I shouldn’t. My sister in law said that whatever she feel is good for her let her do that. But now I understand that for me my parents have gone through under a lot of pressure with my 2 kids. I thought I would go to Dhaka and see the lady Professor I always go to and listen to what she says. If she says the situation is bad I would stay back and if not then I would return. But my husband didn’t agree, he said I didn’t need to go there (16). To me his father (husband) advices to go to hospital (her husband). The direction in which ICDDRDB’s sub centre is located, tell me to go, go to doctors. They(family members) never ever restricted me from going. That on this 22nd will go, don’t forbid to go (17). Then Khadiza Apa came and brought me to Matlab, but they wanted me to stay in house. My guardians, my husband. House, I mean we will go to Khadegaon or Matlab. But my husband is root (GARA) enough. He did not agree. He seemed it’ll be better in our own house, better in house. Mother-in-law had her positive opinion but my husband did not agree. I just told that I want to go to Khader Gaon but my husband threaten me. If I asked him, he just threatened me (20). Who will do tension for me? Mother in law, sister in law, my husband said not go to hospital. Doctors said for the betterment of baby and for me. My husband said, my wife will stay at home. Doctors are not required. I tried to make him understand. But he does not have any sense? If Allah grace, he will say me to go to hospital willingly. If I will, I will stay at home but if there will be problem, I must go to hospital. In that situation my husband may agree (26). My husband told me to go to hospital. I did not take the medicine for gastric every time. They told that it could be created problem. My parents-in-law. They prohibited me but I took medicine after three months. I have to save my life also (27). They used to say do not take ore medicine. Follow the statute.This time also saying the same. Say there is fever, sickness, for want of money cannot bring medicine, do not take (39). I am not allowed to take any powerful medicine during my pregnancy. Family doesn’t allow me to (37).

[Husband or mother-in-law as a main care-taking person]

Take care. (He) Takes good care. My husband, parents, father in law. They look for whether I take food correctly, whether I take rest adequatel. (7). My mother in law and my mother think about me. My mother is anxious about me more than my mother in law. Husband is her guardian. If any harm causes to wife..... She should abide her husband’s instruction (9). My decision? Father in law-mother in laws were there they used to take that, that’s it (10). Husband took the decision. Who else will look after, none is in the home. Of husband’s one. Most of it of husband’s. Will not husband’s one appeal, husband is all the time, that is. Husband is always in thinking in tension so if not husband then whom? (12). Assume if husband stay outside even then everything goes according to him. Follow them since they are telling for my benefit, mother in law’s think it is troubling if anything happens to me, “of my daughter in law” if anything happens, if diseased, mother in law will take care, will run about, must make mention of mother in law and son. Now my mother in law tells, if not eat or if not do anything says “eat else you will be weaker, cannot do , cannot move”, my mother in law tells like these. If do not eat then body will have problem, only daughter in law (15). What will do means, will listen to husband the most.Will defy husband why, he gives everything, feed, adorn why disregard him (15).Will listen to husband’s one, husband’s one have to be listened to. At the time of delivery of my last baby everyone said to deliver at home my husband said will be at hospital, was born at hospital. My husband follows that’s why has to follow. Any fish brought in the evening do not allow me to go near. Again after dusk do not allow to go anywhere. (14). Whatever Husband tells that. Now I do not go with anyone, mostly remain with Husband. Husband’s one will abide by more. I am in his bondage (11). When I tried, they convinced me. Told me that everything will be all right, need not go there, always he was right, he had his confident (20).



[I would follow my own will]

These never followed. Never ever followed. When in laws were alive said. Now I do my job myself, now I do not have that. Normally many a times used to tell do not go out in the evening, do not go in the Noon, problem is there, wind will touch. I did not follow, no time I have followed (10). They said that if I eat it the baby would grow bigger, I ate it in spite of that. They said for first few days, but stopped after that when they realized that I won't listen to them anyway (16). Sometimes they advise me anything on a sudden. But, all the time I can't follow. I understand what I feel better for me. Then I think that may that person doesn't know about certain thing, that's why is asking me to do that (37). If I had listened to her, I wouldn't be able to eat anything; I felt vomit. I felt vomit and bad smell, that's why I didn't take. But if I hadn't felt vomit or bad smell but your mother-in-law yelled at you, I would have taken (39). They prohibited me but I took medicine after three months. I have to save my life also (27). If I didn't follow? I told that if you do not follow elders Allah will angry with you. Sometimes I followed them sometimes I did not follow. I did as my wish which I felt good (41).

[common role – helper, comforter, or consoler]

Used to go for an hour, came back after getting, then my mother in law and Ja did those job (13). Say do not fill up pitcher, do not oil paddy. Do not do other jobs, I have daughter she does all, mother in law does (15). Usually I just cooked rice and sometime husked paddy in the month of Jaistha (a Bangali month). Then I did not have work in the whole year. My mother-in-law sometime cooked, cleaned and also took water with pitcher. My mother-in-law always does something till she stayed in house. She was always doing same (20). They served it at 9-10 am. Sometime I completed my work and also ate rice before going there and sometime I went to take and my mother-in-law managed the rest of the work (20). Household chores? My mother-in-law helped me. My sister-in-laws were not at that time (25). He told me not to do that type work which is related with weight lifting. My mother-in-law. She helped me (27). I tried to finish my every works and sometime did not. But that did not make any serious problem. My mother-in-law can handle the rest of the work (35). Say husband does the bed or arranges the interior. Does this, if required, fixing the mosquito net and taking kids for showering (this is done by him) (40). Whatever is good that is said by my Husband. Don't you see allows me to work less. After this fills pitcher and fetches that. Does whatever he can. My Husband takes, who else would take (11). Like used to draw water by pails, fetched water with bucket. He (husband) used to stay at home, then clothing, if there were enough clothing washed those (12). Now I observe he does a little. What I cannot do does that. Sweeps the homestead, gives bed cushion in the Sun. Attends the heavy work. Brings food items (13). Heavy work that I could not do those he did (19). Sometimes he helps in the household works (37). Used to help. When he used to be at home, I could not fetch 1 or 2 pitcher of water, pitcher----(respondent starts speaking). Fetched. Used to do this (39). My husband helped me also. For example he filled pitcher (by water). He took the rice pot (the dish where rice cooked). Sometimes I did not clean my house by broom then he did it (41).

His father tells you do not think, do not take tension. Consoles tells do not give in to fear, Allah has given the hurdles Allah will send succor, offer 5 times Namaz and pray to Allah, Allah please rescue me intact (15). My father-in-law and mother-in-law, my sister-in-law, my husband consoled me that no need to fear, lot of pregnant mother faced it but does not happen any bad. As many problem so many treatment. They consoled me (25). my husband tried to keep me quite and tension free by his speech. He told me that though you are going in the troublesome situation but you will get a baby (27). He also told me do not think anxiously or don't think much (38).

#### 2.4.1.2 Unique roles of husbands

[unique role of husband – money earner]

What will do means, will listen to husband the most. Will defy husband why, he gives everything, feed, adorn why disregard him (15). My brother-in-law went there and he said that he will send money with other people. He asked about my feeding, and suggested to eat eggs and again sent fruits (25). My mother takes the decision. I do as my mother says and however my husband earns. We don't have income. So, we have to do as husband asks (37). He says that he will go for work and only then he can earn money (39). Pregnant mother thinks just like that, or husband doesn't work, nothing is there in the house, tension arises (8).

[Unique role of husbands – bringing food]

Husband used to bring, eat this eat that. There are ate fruits also. After coming good vegetables curry, fish, meat after husband used to come earlier in other time ate myself (10). Think whatever is ordained in our luck that is, in the mean time if I could arrange something could have eaten. Now if this was in Husband's luck would have bought fruit then would have eaten and this is not there when what get eat that that's it (11). All ways think Apple and the like, Banana and the like is eaten, when his father come from Dhaka bring along. Brings just like that brought earlier now brings (13). His father keeps on bringing one after another this that give. Like he went to market he doesn't return empty handed he will bring one or the other thing (14). He used to bring the foods which were good for the baby and me as well (16). (He) Says. Eat properly, eat regularly. Brings. Eat this-eat that. That, fruits brings. Brings good items from bazaar when comes home. Egg-milk-fish (19). He took food for me every time. Yes, he also took different food during that time. He is good enough (20). He always tensed for me and called me over phone. My brother-in-law went there and he said that he will send money with other people. He asked about my feeding, and suggested to eat eggs and again sent fruits (25). If he could his job a lot then he purchase varieties of vegetables and fish. Say, he brought biscuit, and I eat. Sometimes I eat a little quantity of biscuit or sometimes I eat a little amount of rice and sometimes I keep the

rest of food whatever I cannot take (26). Which I liked to eat at that time he gave me to eat - fruits, eggs and milk (27). I ate muri, chira or sometime biscuit (If my husband brought it) (36). Their father is also shouting (caring for). He brings something (38). Then husband used to insist to be in rest, used say, used to give or whatever used to bring ate. like that did not bring much for me, as I said, whatever used to bring during my pregnancy. This time. Subsided, he is not at home, if he were at home then today he would have brought things on credit, would have taken loan, would certainly have brought medicine. Would have taken. Now he is not there, who would give? Was not in home, he was in Dhaka. Say, used too come home, at that time used to bring something. May be I have eaten 1 or 2 mango during the mango season or if he (husband) had brought apple or anything was shared then I could eat (39). Say he brings a jack Fruit, says take more, purchases milk and asks to take. Biscuits and the like. Banana or whatever he can within the lesser cost (40).

[Unique role of husbands –others]

They said to me that as it has been happened ‘just keep it, do not destroy the fetus, Allah has given a baby’. He also advised not to abort it (9). They asked me to try for a son try for a daughter. This was the condition. There was a problem; they quarreled with me and even sent me to my maternal house. Then, my husband went there. I couldn’t manage any birth control system. Then again...he forced me to do that and my baby was born (39). From market brought Tablet. Couldn’t eat (to reduce vomiting) (17). It means that, if I would feel bad then he I should be given medicines from markets (39). Then my husband-----poor mother, he cannot say anything to mother, leave it, whatever mother says listen to her. I also take my husband’s view and go on. Make us understand, to mother her way and to me my way. Relation remains so that there is no affray (7). He said nothing to his parents. He only said me to go to my parent’s house rather going to my in-law house (39).

### 2.4.1.3 Unique roles of mothers-in-law

[unique role of mother-in-law – generational gap]

Intermittently mother in laws tell how they used to be earlier, and how we in these are (18). One that of mother in law’s advice is not good, as they say they also were pregnant----“we were also pregnant”, didn’t we work all, that’s why they do not feel mother in law to be correct. In laws do not make understand everything (7).

[Workload] About working, I don’t take heavy loads when I am pregnant, then they say that like we didn’t work when we were pregnant! Stuff like that. There are many times when I couldn’t do anymore, then they used to say that why you can’t do it...we did when we were pregnant! My mother and their generation used to work all day long unless the baby was born, used to pedal out the paddy. But in case of us pedaling is strictly prohibited, we are not even allowed to carry 2 KG water. The doctors forbid to do heavy works. But the older generation they say that they worked a lot and didn’t have any problems. Now we get sick even if we don’t do heavy work but our mothers they can still work as they used to in their times. We can do nothing comparing to them. We don’t take heavy load but still we are weaker than them (16). Like, in many families, persons like, father-in-law, mother-in-law many a times do not like it. “New baby will born, didn’t we had babies”? “Why you will not be able to do it”. One that of mother in law’s advice is not good, as they say they also were pregnant----“we were also pregnant”, didn’t we work all, that’s why they do not feel mother in law to be correct. My mother in law doesn’t understand this. “Now I am telling mother I am not feeling well now”, “do it later”, then she doesn’t like it very much. How, I do not do the job then, do the job later when I feel better. She doesn’t want to do any job, wants I do all works. This is not wanted, now she wants I carry the heavy pitcher, large pitcher, I will bring those, do everything myself (7). I told her. I told her, “Mother-in-law, you had also days like me. How did you feel then?”. I might do any do after 10 min, I might poured the vessels with water later. But, she never allowed me to do that. She got angry with me. That’s why I also that she had same days like me. She said that they had never passed any leisure time (39). Now the time that has come, in that have to say eat this do that, with slight pain in the abdomen go to hospital. Heard before with baby in the womb mother in laws used to do everything, Dheki kut ta, gave attention to paddy in this baby used to born. Now if baby is I the womb cannot touch any heavy thing. Tells laughingly “what a time has come Bou do not work,” (18).

[Eating] And the requirement of food for each baby is different...like when I had that daughter of mine I used to feel hungry a lot. The amount of hunger was a lot, such was the amount that a normal meal wasn’t enough for me. My mother used to say about my eating that I have bad days to see. She used to say that I ate so much! (Laughter). But never in front of me. She told me this later after my baby was born (16). This you think earlier era people used to tell now we do not believe this. Said that if eaten more baby becomes smaller mother have problem during delivery. If delivered quickly think trouble is less at delivery. Problem doesn’t deliver on over eating (11). About the whole program, the elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery. It’s a trick of them to have scissor-surgery, they make the baby big inside the womb so that it cannot be delivered normally, it brings benefit for the doctors. This is what the elder people say, and we think that if the baby is healthy inside the womb then it will be healthy after it’s born, it would not get sick. That’s our opinion, but the elders say that by feeding nutrition they make the baby big inside the womb (16). They said that I can eat everything. There is no restriction. In the old times the mother couldn’t eat fish for a week. They say that it causes skin problem for the baby. They say that baby gets skin rash I the mother eats fish. they say if you eat fish those rashes would become worse and won’t go easily. But I ate fish and my baby is fine by the way. I don’t follow this anymore but I used to. (Laughter). I don’t follow it now because I don’t follow any restrictions about food anymore. I eat everything (16). The people of old age they said what is the necessary to take the tablet? We did not take, what is wrong with me. No, they said only, there was no problem with us (26). Oh! My family members, they did not know these so many things. They were aged

persons. They did not eat these tablets. But they did not feel bad for my going to attend the training. They only thought that I should have to maintain the present updated rules (27). No. this is not heard this days. Previously people is to say lie this Earlier people is to say (voice wanes), during mother and aunts. If one takes more food size of the baby becomes larger. Baby is harmed at the time of delivery, mother feels uncomfortable? Mother falls ill, they said that. And these days say to take more food, that will keep baby healthy, mother will remain healthy. Again baby will be smaller. Size of baby will be small if one takes more food, do they also say this? (40)

[Seeking medical assistance] They say, as “we have not gone to hospital, what had happened to us? Did not we bear children? Exhorts like these. ---- (feebler voice). Then I reply that during your time, these were not there and you did not avail of these. Since these are available now we go (7) At home my family members, even my mother said that in the older times every baby used to be born at home, now a day everybody runs towards the hospital. Everything depends on the thought. We have to rush to the hospital because we think that we need to go there, nothing else. They say that their babies were born at home; they didn’t need to go to the hospital. Now the new generation has new system. All they want to go is only the hospital (16). Now the time that has come, in that have to say eat this do that, with slight pain in the abdomen go to hospital. Heard before with baby in the womb mother in laws used to do everything, Dheki kut ta, gave attention to paddy in this baby used to born. Now if baby is I the womb cannot touch any heavy thing (18). She used to make quarrel with the doctors or whoever tried to help me. She said that all those people have made me spoilt. She has also given birth but she didn’t receive any assistance. So, I also should not receive (39). What should I say! It is my in-law’s house. My mother in law and my father in law.... what more they will consider for me? They did not like it. They said, ‘she always takes medicine, all the day she eats medicine.’ That is it (9).

[unique role of mother-in-law – involved in delivery process]

At home my family members, even my mother said that in the older times every baby used to be born at home, now a day everybody runs towards the hospital. Everything depends on the thought. We have to rush to the hospital because we think that we need to go there, nothing else. They say that their babies were born at home; they didn’t need to go to the hospital. Now the new generation has new system. All they want to go is only the hospital (16). My mother- in- law agreed to do the delivery in our own house (20). The second one...it was around 12 o’clock at night. December 21. I was lying in bed and suddenly my water broke. I tried to get down form be...instantly the head of the baby came out. No one was with me at that night...I called my mother in law to come to me. She said “let me get your mother”. By the time she bring my mother...the baby was born. Then my mother washed him...yah..and the midwife did not come. There was no need for the midwife (9). Your (feeble voice) middle baby was delivered, your going to Hospital. My mother-in-law had set everything right, meaning will take to the Hospital....while it was experienced the pain, my pain oh my pain....cannot step out of house, then brought the midwife...in the mean time by the Grace of Allah baby’s head had set in (11). My last two deliveries were in hospital at Matlab. I went to hospital feeling the labor pain. I went with bus. My parents-in-law or mother went with me (35). In case of my first child, I was cooking, when the pain started, I thought that I should finish cooking first then think of delivery, when my first child (girl) was delivered in the kitchen, she was delivered without any assistance. But my mother in law was in the house, she helped me a little (40).

## ***2.4.2 Family’s concern – economic status***

[Poverty of the household] Sometime I felt anxiety because of my poverty. There are many things. Does everyone have the same fate? Everyone has sorrow and happiness. Not that much...(meaning not much anxiety). That means there are many types of poverty related things in my family. So I was anxious about these (41). I had already two children. I did not want to have another baby. But again I took it (meaning became pregnant). So this type of thing (meaning C-section) happened. I was anxious because the date already passed. Then I thought that the worst condition. I did not have that much money. Child had not come yet. I did not feel any pain. Where I have to go... If Cesarean needed, how I could manage a lot of money. That’s why I felt worried (41). we had already 4 kids and I used to be very thankful to Almighty Allah, took birth spacing pills even then nothing stopped me from getting pregnant. And this boy was born (showing one of her sons).The family size increased and thought came how to raise them as proper human, how to feed they so on and so forth (40). How can I stay at hospital whereas I have other children. Where will I get money? Allah will get me will. There is no ending of tension. How will I get food? How will I get clothes? (26) Allah gives whatever, we eat that. Sometime there is some change. If he could his job a lot then he purchase varieties of vegetables and fish. In the normal condition the menu is same. Some women take food of different amount in different time. Some take food four times in a day. Say, he brought biscuit, and I eat. Sometimes I eat a little quantity of biscuit or sometimes I eat a little amount of rice and sometimes I keep the rest of food whatever I cannot take (26). I have much wants in my family. We sometimes quarrel with each other. These are matters of worry. Sometimes I worry about how will I rear them up? How will I give them good food? There is wants in my home. What should we eat! Another thing is that I will have to do all the works (39). Before he used to work. Or father in law also did some work. Or I had a sister in law in my family, that time she could work a little. I myself was in rest. Body was alright. Now everything has fallen on me. He only said me to go to my parent’s house rather going to my in-law house. There is wants in my home. What should we eat! Another thing is that I will have to do all the works. He says that he will go for work and only then he can earn money. If any husband has money then wife also behaves well with him, otherwise not. What! He didn’t have money then. But, I could work (39). What tension I had? My husband was unemployed in that time. I had two children. How will I give them education? Who will we maintain our family? My husband had no income.

I had to thought like this (9). Pregnant mother thinks just like that, or husband doesn't work, nothing is there in the house, tension arises. Accident do occur, heart of mother may fail at times. This one thing you said that owing to deep thinking heart may fail. Heart may fail. Can fall due to unconsciousness (8). My mother takes the decision. I do as my mother says and however my husband earns. We don't have income. So, we have to do as husband asks (37). Sometime ate fruits. Sometime ate grape, milk, eggs, but very few time. It's not so easy because we are in a joint family. Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer. I tried to eat more for my child's safety (27).

[Food availability] Biscuits and puffed rice as we are poor, what kind of food we can eat? I cannot take always but whenever I afford I take. She said to take anything that is available in home. For example, sometimes there is biscuits or puffed rice available at home. Or there is flour available to make bread by it (9). Ate fruits intermittently. There was no time. The day those were available ate. Fish, vegetable, occasionally brought meat (10). We do not get to see even Pineapple where from we will get to eat (giggle). Can eat think if brought then can eat. I when whatever then could, could arrange, could eat. Couldn't arrange didn't eat. When got ate then (11). Since Doctor Apa advised to eat more good food said whatever can eat t to it that whichever my taste feels to eat that, poor person whenever can bring anything eat. Eating want to eat a little good, think that poor person cannot bring, even after that does anybody try less? (15). Did not eat Pineapple when this was in womb. Didn't bring and didn't eat Pineapple. If brought would certainly have eaten (12). Then its good for the mothers. There are many poor ladies who cannot even get proper meal all day long, if they get nutrition they would get the surety about one meal at least. We don't have any problem about food. But there are woman around us who can't even manage to eat proper meals let alone extra. So if nutrition is given then they will be able to eat at least one meal properly. So it's good for those mothers. Whatever they brings in and cooked, I eat that's. no problem at all. It was normal (16). Where to eat from poor person, of poor person. Poor person. Now there is nothing that----nothing is there that now that will go to Lady Doctor after that bring beneficial medicine or there is no such money to buy this or that for eating. Nothing different is there, may find fluffy rice is there, biscuit is there, Chanachur is there, eat this, again often----they aren't at home, now biscuit means that "Out food" is a little less. Other food availability is lesser. Intermittent food is less (17). They say, what will come if say, have not to have money? You also tell drink milk, eat egg. Will eat with what? That can be followed, milk egg can be eaten but don't you required to have money, for want of money cannot eat (18). Again sometime ate egg, we are poor people had to cut according to cloth (19). Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (20) Every food is permitted but not in my fate. I wished to eat many things but ill fate. I wish I eat everything, I want to eat good food. If we don't have how can we eat! Many women do not have food here, no doctor, no money, how they will run their family? We try how to save money. Sometime there is some change. If he could his job a lot then he purchase varieties of vegetables and fish. Say, he brought biscuit, and I eat. Sometimes I eat a little quantity of biscuit or sometimes I eat a little amount of rice and sometimes I keep the rest of food whatever I cannot take (26). What can I do? We don't have money. I have to eat nutritious food, but how could I manage money? (35) I ate muri, chira or sometime biscuit (If my husband brought it). What can we eat, we are poor. We have also a lot of family members. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? I eat what get. I tried to take that I got (36). There is no ending of tension. How will I get food? How will I get clothes? (26) I have much wants in my family. We sometimes quarrel with each other. These are matters of worry. Sometimes I worry about how will I rear them up? How will I give them good food? We have wants in my family. He brought his sister. Where we can't manage normal expenditure of our family, from where could we manage the extra expenditure? I told him all. . Apa, really, we are in want. There is no rice, no dal. There is only want. There is wants in my home. What should we eat! Another thing is that I will have to do all the works. It's like whatever is available at home, I ate. If he brings fish today I will eat fish. Then, I may eat dal or vegetable. I couldn't because there was not. There was no money to buy that food. I would eat then when there would be food in house. Sometimes I lied to them that I had taken food. I have told you that if those were brought to home then I ate otherwise not. Whatever is there in my house, I will take that, and will any one give extra food? Who will give? (39) I have taken when I have got them, did not take if, I did not get them. Since I am anemic, take food that much as it is ordained in my luck (40). Sometime ate fruits. Sometime ate grape, milk, eggs, but very few time. It's not so easy because we are in a joint family. I tried to eat more for my child's safety (27).

[Concern about c-section] Suppose...earnings of my husband is..if we go to hospitals then we need to pay the rent...that is a matter of worry...if something happens..Anything can happens during the delivery. Say they take knife...they do scissor operations. No one is having normal delivery. They are "delivered mother"...scissor or side scissor happens...or you have to go for knife (9). Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer (27). There is much expenditure for delivery. From, where would I arrange all those! I worried about it. I have never thought of it. I had my child before. Had I ever thought of scissor! (39) What else should I think? Whatever had to occur had occurred, think of anything ominous. Say, I may need operation, which may require a good amount of money (40). I had already two children. I did not want to have another baby. But again I took it (meaning became pregnant). So this type of thing (meaning C-section) happened. I was anxious because the date already passed. Then I thought that the worst condition. I did not have that much money. Child had not come yet. I did not feel any pain. Where I have to go....(41) There is much expenditure for delivery. From, where would I arrange all those! I worried about it (39).

[Medical assistance seeking behavior] People around me said, "Follow the prescriptions given by the Siarel doctors. Now you are taking medicine. If they ask for routine check up the do it. if they ask for ultra sonogram, then do that. They said that the Siarel

doctors.....as you are poor, you won't be able to visit a private doctor. So, follow whatever they advise you. " (39) They thought my husband bought medicines from markets and I am getting weighted. They also thought that in this way they would run out of money. If medicines are bought for me then they will be run out of money. I don't ask for medicine, none brought medicine for me (39). In that time when I was sick, I took many types of medicine but then people took this matter badly. But now as I am taking medicine for my pregnancy, they have accepted it normally. What should I say! It is my in-law's house. My mother in law and my father in law.... what more they will consider for me? They did not like it They said, 'she always takes medicine, all the day she eats medicine.' That is it. For spending much money they said it (9). How can I stay at hospital whereas I have other children. Where will I get money? There is no ending of tension. How will I get food? How will I get clothes? They tell to go to the hospital for my betterment. Many women do not have food here, no doctor, no money, how they will run their family? (26) For care or anything, money is needed, understand? Does everyone have this facility? I worried about that. But, I need money to fulfill that. Actually, I am not being able to do anything as I don't have enough money (37). They would run out of money. If medicines are bought for me then they will be run out of money. I don't ask for medicine, none brought medicine for me. Today... (39)

[Make a plea to Allah for economic status] If Allah and people help me, I will get rid from this tension. What should I do more, I will call Allah. Where will I get money? I do not have money, where will I go? Water is everywhere, people are...(21) I don't worry at all. Allah is there, isn't He? Allah. Allah is there for the poor people. I always depend on Allah (37). I prayed regularly. I had always remembered Allah; I prayed to Him that as He had given me child then He might allow me to deliver my baby without any problem, so that I wouldn't have to pay money for that; That He cares for a poor like me (39). God will do whatever he feels right for me and I believe in y providence. God will do whatever he feels right for me and I believe in y providence. Assuming that I have no money, I cannot fight the odds. Now by the blessing of Allah, you have come to me and said that you will give non refundable Taka 500 or Taka 1,000 or take me to hospital and I am out of problem or danger, like this Allah alleviates my problem. Allah will bless and with his blessing (40)

## 2.5 Dietary Practices

[Light foods] Hmmm. Besides this rice, I also take light foods. Rice....Actually I take more light foods (than rice). This type of things, I usually did not eat before. Say...I ate in the morning and I ate again in the evening. In this evening, I took some light foods. Now you know, I have to take besides these, something. Rice. I always take rice three times. Besides rice, morning I eat Rooti. if we make something, I eat. And in the evening, I just consumed light type of foods. Previously I take "Bhat" in the morning, at noon, then in the evening I took light foods, at night I took rice. Besides, my meals, I take some types of foods (meaning light foods). Besides this rice, I also take light foods. Rice....Actually I take more light foods (than rice). Sometimes I take bread, banana, flakes etc. Once, twice sometimes thrice times a day. Those are light food, so you can take it anytime. At least 3 to 4 times a day (1). Then normally I took rice three times a day. But sometimes I took light food. Say I took muri in the morning. Again I took muri in the evening (2). About 20 days in a month. Two times breakfast and snack (9). No, at that time no any---say at that time ate rice, didn't eat so much snacks. When baby was in womb couldn't eat, but at that time ate snacks a bit more. Snacks means, say ate fluffy rice, or ate biscuit, ate banana, that's it (12). Yes, sometimes I take bread, banana, flakes etc. Once, twice sometimes thrice times a day. Those are light food, so you can take it anytime. At least 3 to 4 times a day (4). Take this 3, 4 or 5 times, like I have taken an apple now, after some time I will take an egg, in this way I take nibbles frequently (7). Ate those two times. Ate in the morning and say around three O'clock three and half O'clock. Ate another time, again sometime in the mean time ate rice two times, around (12). Ate snacks for this reason that did not yearn for eating, cannot eat, so ate snacks (12). Took meals 3 times, meanwhile at noon He brought Jack fruit. Also ate Jack fruit. In the afternoon. After taking rice and other food took Jack fruit. This Jack fruit. Some food remains differently . Take something and take rice. Biscuit or bread. In the morning as well in the afternoon. Take before rice and after rice. Such food is taken; if fluffy rice is brought then I take (8). I eat breakfast at morning. At noon I eat rice. After taking rest in the evening I take puffed rice, then I eat rice at night. Biscuits and puffed rice as we are poor, what kind of food we can eat? (9) Eat like this, if there is fluffy rice eat sometimes, that's it (11). Ate rice three times. After that light biscuit. Biscuit was regularly there (14). Thing ate Rice 3 times and biscuit-fluffy Rice. In between ate twice and snacks (15). In the evening if bread is brought or biscuit if brought from bazaar (24). I made tea and took it with biscuits or ate muri or someday ate hand- made cake (25). Sometime we ate handmade cake (36). Nothing different is there, may find fluffy rice is there, biscuit is there, Chanachur is there, eat this, again often---they aren't at home, now biscuit means that "Out food" is a little less. "Out food" means side Food outside Rice, is less. Ha, other food availability is lesser. Intermittent food is less. Means snacks of sort (17).

[More food was recommended]

Till now everyone advises to take more food. It is for the sake of fetus. Other people say this (6). This most of them say that now do you say to go to them, telling to talk to them, about various matter they say to move around correctly, ask to eat. Move around means walking-move correctly, eat adequately. More of eating means ---most of the cases it is seen that cannot eat, now go and eat, when feel physically well. Go eat, when feel good eat, when physique doesn't feel good do not eat. (Others say this to her)

(17). He told me to take more foods and also forbade me to do heavy work. They push me to eat more foods. (38). Convention means what, at my mother-in-laws home they say if more food is taken then the baby remains in correct posture (17). I am not able to take much food. I cannot take that much food, but I want to. I am able to take that much food. But I want to take various types of foods. I want to try. Their father is also shouting (caring for). He brings something... He is not angry (shouting), but (he is saying) I need to eat more. If I am able to eat more, I will be fine and my child will be also fine. Will be good. For that reason, my husband did this. (38) They also forbid me to do heavy work. To take rest and to try to take more food. Previously if I took meals three times per day, now they tell me 4-5 times. They recommended these things (1). "You have to take more" advised the doctors (6). Midwife advises to stay good, to take good food, more quantity (7). like tells to eat a lot of thing. In pregnancy they tell to eat supplementary food. They tell to more than what ate before (14). She suggested eating nutritious food. She suggested to eat more than before (27). They suggested as because I am weak and suggested to eat more and told about the delivery that it could be better to do it in Hospital (35). They tell to drink more water and more food, more good food (36). They also forbid me to do heavy work. To take rest and to try to take more food. Previously if I took meals three times per day, now they tell me 4-5 times. They recommended these things (38). They advised me to eat more frequently (39). I went to the hospital, they had advised this thing, because "you have low pressure" "you have to take more" advised the doctors. (40) Took and ate food properly, if expecting mother eat properly then the baby will born healthy, baby will remain good, to eat properly (15). They used to advise me to eat less but I should eat frequently (5).

[Decreased food consumption] Take after conceiving I have problem in eating. Again sometimes could eat full stomach. Could eat full stomach sometimes again sometime cannot eat. At that time ate rice, didn't eat so much snacks. When baby was in womb couldn't eat, but at that time ate snacks a bit more. Couldn't breathe. Why did eat? If didn't eat then became weaker. Felt very bad physically, physically remained good if eaten small quantity, that's it. Ate smaller quantity. Ate less. (12). Ate more considering own physique again baby would be healthy. I was of a little frail health, I myself will get a little energy At the time of conceiving a baby many cannot take food. Feeding reduces. (17). I did not get much. I did not feel interest to eat. When I felt better. I ate some. But it is less than the before. I eat what I get. I eat less than before (36). I was not able to take that much food on that time (during pregnancy) (2). Take less amount. It was born 2/3 months ago, 2/3 months I cannot take any food, again now due to gastric the belly remains bloated, then in such cases I take twice, also once. At that period I could not take food easily. Did not feel like taking (6). Cannot take more, what problem occurs if taken? Shal'n't there is problem? Can more taken at a go? Can pregnant mother eat more at a time? They nibble. Should the stomach not accommodate them? (6) I under this circumstances cannot eat more, cannot eat why, if I eat small quantity then I feel discomfort, that much cannot eat. On eating just small I feel filled up. I can eat lesser than before take it. Absolutely since this baby was in my womb I cannot eat (11). I think it is less than before. Cannot eat as before. Due to presence of baby in the belly on eating less feel filled up. Less. Cannot eat more cannot eat more, I cannot eat more than this, if cannot be eaten more can it be eaten? (13). Used to eat 4 times, 3 times, actually it doesn't feel to eat, even than forcefully ate something. Used to eat 4 times, 3 times, actually it doesn't feel to eat, even than forcefully ate something. Have reduced. Total food after coming of baby (14). Now my mother-in-law tells, if not eat or if not do anything says "eat else you will be weaker, cannot do, cannot move", my mother-in-law tells like these. If do not eat then body will have problem, only daughter in law. Now cannot eat more, after eating cannot sleep, how do I feel! How do I feel feels like pressure on the Liver (15). I mean like I didn't take any extra food. Like many people normally eat 3/4 times a day and when they get pregnant they take food 4/5 times a day. But I was not like that. It's like after the baby came into my womb the amount decreased. I mean it was like if I take a good amount of food I used to feel restless. I mean if I take rice too much I used to feel tired. (Laughter) (16). It was less in his case. I used to eat less than normal (16). I ate four times. But after getting pregnant I am eating for 5 times. I felt hungry, so ate more. I ate more rice every time when ate three times a day but now I cannot eat more. So I eat muri, chanachur every after few moments. Ate less rice. Decreased. Rice. Quantity has decreased but number of times have increased. I could not eat rice much. I took three times as-usually but didn't eat sufficient and that's why I had to take other foods. I cannot even take one plate of rice (25). If any pregnant mother eat less food it would be reason for the baby to die, pneumonia, it may bleeding in naval, and the mother may die. My fetus took his food through me. So, if I ate much, he could get more. I ate before. In this condition I have no taste in my tongue but I take food twice in a day. I feel discomfort move, I become tired if I eat much good. I feel suffocate to eat much. I cannot eat. Whatever I can, I eat (26). I ate less during the pregnancy period. I lost the desire of food. It was dependant on situation- sometime I felt better and ate more and sometime ate less. I ate as much as I can. (27). I eat what I get. I eat less than before. I did not feel interest (36). I cannot eat much as before. I could eat much before becoming pregnant. I can't now. I am eating as I did normally but in lesser amount. Sometimes, I become hungry, sometimes I do not. I am eating as I used to eat daily. But the amount is less now (37). They recommended 3-4 times eating, forbid to do heavy work. They tell me because of my well-being. For my well-being and also for my child's well-being. If I am able to eat more, I will be fine and my child will be also fine. Will be good. For that reason, my husband did this. It's for well-being. During my pregnancy, I am not able to eat. A few days..you know..say..Few days, I took only water of rice. I smashed rice with water, and I took only water. Because I am vomiting (means she cannot take any other foods). I am vomiting a lot. I am not be able to eat that much, which previously I can. Now I am eating less. In normal time, I eat more. But now I consume less foods. Previously I take "Bhat" in the morning, at noon, then in the evening I took light foods, at night I took rice. Less frequency. But now the frequency is increased (38). They said to me, "you will have to eat frequently, and it will help you to remain healthy. I used to eat more before becoming pregnant but after that I eat less (39). One meal used to reduce. That reduced, did not take breakfast, took rice (40). I ate less, I felt headache and weak (35).

[Increased food consumption] Always the same only increases in quantity. Same, during pregnancy take a little more (7). Take 3 times. During pregnancy take a little more, now take a little less. Then I take full stomach, now cannot take full stomach, otherwise now---. It causes problem in movement, feel tiring. Bad thinking around these are there, malPushthi develops due to less intake of food, doesn't become healthy, fall off due to vertigo. Ate less. Less food ate then baby was in the womb. More did not eat. More couldn't eat, felt. Yes felt hopeless that is it. Used to breath sigh. More food ate, felt more troubling. (8) After becoming pregnant I am taking more quantity of food than before. For getting strength and getting energy. They said from hospital that if you take more food, your fetus will be healthy and you will get energy. When you will deliver your baby you will be weak. If you do not eat, where your baby will get food? (9). More. Wasn't baby in the womb felt hungry by myself also, one person is more supplementary food is required. Now I am eating food of one person then baby was another one and another was myself total two, so had to eat for two person, isn't it (10). I tried to take more as possible. People, the seniors told that if mother took more food than her fetus remains better and if she took less than fetus would be big in size. Then it would be easy during delivery time. Sometime I ate much and sometime got less food (20). Increased in my case. When baby is in the womb. Increased in quantity, food a little more. But food is rice three times the same. Increased. Say what used to eat took a little more. When your stomach is empty the quantity of rice you eat, when baby is in the womb then shouldn't you eat a little more for baby to eat. From the beginning eating increased that's it (24)

[vomiting] Yesterday, I felt better so I could take foods. But today I do not feel good. I vomited a few times today (1). On vomiting I didn't eat anything. Means throat also got injured. Then rice means ate regular food but ate less that's it. Ate less in quantity That it is seen until six months that's it. Seven-eight-nine-ten these three months ate more (10). At the start first two months cannot eat anything, vomiting was there (12). Eat a little bit more. When baby is in the womb cannot eat more. Feel vomiting, that vomit used to come. Now it is eaten more. That time didn't eat due to vomit. After that a massive eating is undertaken. I eat the same considering body requirement never eat more. So that it feels easy for my movement. Normally I eat less, cannot eat more (13). At that time could not eat for three months. One time in whole day could not eat. After baby came in the womb the vomit came (15). That time I didn't eat much. Every time I feel vomiting if I wish to take food. I tried to eat often. I always tried a small quantity of food with at intervals (20). Yesterday, I felt better so I could take foods. But today I do not feel good. I vomited a few times today. Just lying down after taking my tablet. Because of vomiting, I am not able to take foods. During this pregnancy, I have not been able to take that much of foods. But I can take more by the bless of Allah. Say, if we pass three months, I can take everything. Because of my vomiting tendency (38). I was not able to take that much food on that time (during pregnancy). I felt vomiting (41). I eat 2 times a day sometimes 3 times a day. When I have conceived, in the initial stage I couldn't eat and I just only vomited. Now, I can eat little (37). During this pregnancy, I have not been able to take that much of foods. But I can take more by the bless of Alah. Say, if we pass three months, I can take everything (1). I couldn't eat much during the first 3 months. From the time I could eat, I ate. Could eat after three months now again cannot eat. In the middle could eat properly (15). First three months couldn't eat absolutely. Then slowly and gradually change came. When I had good taste then ate more (19). I did not eat naturally at the first three months of the pregnancy period. I felt vomiting. After then this problem was over and I ate everything naturally (27). My first, I was during first time when baby came in the womb at that time could not eat anything. Cannot even drink water. This during both the child, that cannot rise from bed, on water, on saline, gave eight saline, kept me on saline. Cannot eat food. I face this condition when baby comes in the womb. It vomits. Could not eat. Used to vomit and could not rise from bed (14).

[Decreased food consumption due to food unavailability] They advised me to eat more frequently. I didn't eat anything extra. What should I eat! There are many things like snacks, biscuits, breads, banana, egg are found in others home and so that they can eat. You are right. There was nothing (39) Then its good for the mothers. There are many poor ladies who cannot even get proper meal all day long, if they get nutrition they would get the surety about one meal at least. We don't have any problem about food. But there are woman around us who can't even manage to eat proper meals let alone extra (16). Where to eat from poor person. Poor person. Now there is nothing that-----nothing is there that now that will go to Lady Doctor after that bring beneficial medicine or there is no such money to buy this or that for eating. Nothing different is there, may find fluffy rice is there, biscuit is there, Chanachur is there, eat this, again often----they aren't at home, now biscuit means that "Out food" is a little less. Other food availability is lesser. Intermittent food is less (17). Sometime ate fruits. Sometime ate grape, milk, eggs, but very few time. It's not so easy because we are in a joint family. Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer. I tried to eat more for my child's safety (27).

[Decreased food consumption due to big baby] Sometimes. I was asked because if I had eaten more than the size of my baby would be bigger. Then I would face problem during my delivery (5). I did not have any tension about this. I tensed only that if my fetus will be big in size then it could make a problem during delivery. Many people told that if mother ate much then fetus will be big in size and arose trouble during delivery time (27).

[Lowered interest in eating during pregnancy] Couldn't breath. Felt very bad physically, physically remained good if eaten small quantity, that's it. Ate smaller quantity. Eating is not liked. Did not feel like eating. There is no other reason. Did not feel for eating. It was like this for 3/4 months, it did not feel at all for eating. Who can eat it more that's it. We couldn't eat, that it doesn't appeal to eat. We couldn't eat at all, it doesn't appeal, cannot eat, cannot eat at all, all through (12). It didn't increase much. I mean I didn't have much appetite. It was the same about the elder one too. Didn't have much interest for food (16). Like this again it is seen at

times or doesn't feel good eat something else, that's all like this. Again it is seen that eat 2 times, physically sick, for this cannot eat don't eat. Change! What change? In the meantime could not eat anything, eat----could not eat. Didn't feel, didn't eat. Felt bad meant didn't eat. Couldn't retain anything after eating didn't eat (17). When felt taste eat more, when didn't feel taste ate less. When the baby was in womb could eat less why don't know did not get taste. My weight didn't increase Apa. My baby was born only 2Kg 700gms. I do not know why there is no taste. Means didn't feel much hungry after that could not eat much of it. Didn't feel taste. Actually I didn't feel much hungry and taste was also not much taste. Didn't feel good and didn't feel hungry as well (19). I eat what I get. I eat less than before. I did not feel interest (36). I used to eat more before becoming pregnant but after that I eat less. I don't feel anything tasty, and that's why I eat less (39). I ate before. In this condition I have no taste in my tongue but I take food twice in a day (26). I ate less during the pregnancy period. I lost the desire of food. It was dependant on situation- sometime I felt better and ate more and sometime ate less (27). At that period I could not take food easily. Did not feel like taking (40) Many people say that normally a pregnant woman feels hungrier than normal time. But, I don't feel so. Sometimes I feel hungry. Sometimes I do not. (37).

[Women ate food according to their desire] I say that one should eat as one can, now you can eat you can eat, you have desire, wont you eat then? (12) I did not get much. I did not feel interest to eat. When I felt better. I ate some. But it is less than the before (36). I take for my good, whatever I can eat, whatever stomach can accommodate (8). Must eat according to urge for food. Eat according to urge for food. A persons feels for eating when urge is there, without urge cannot eat, feel for eating only when one has urge for it (14) When I had good taste then ate more. The same. What is the same! When felt taste eat more, when didn't feel taste ate less (19). When I felt better. I ate some. But it is less than the before (36). That time could eat more in one time, due to feel of hunger. When feel hungry then eat, if do not feel don't eat (13). It was dependant on situation- sometime I felt better and ate more and sometime ate less (27). I felt hungry, so ate more (25)

[Other reasons for the decreased appetite] Can more food be taking at a go? Can more taken at a go? Can pregnant mother eat more at a time? They nibble. Should the stomach not accommodate them? (40) I told that if I consumed more food in my house after that again I needed to take pushti (nutrition) there (centre). After that I had to come back on foot. It's my small stomach.(mean- this was excessive if she took more) (2). I under this circumstances cannot eat more, cannot eat why, if I eat small quantity then I feel discomfort, that much cannot eat. On eating just small I feel filled up (11). I mean it was like if I take a good amount of food I used to fell restless. Couldn't do any work then. I mean if I take rice too much I used to feel tired. (Laughter) (16) After eating Pushthi ate less other food. Because stomach remained filled up, there was no urge for eating other stuff (18). Say due to eating of Pushthi other food intake reduced, feel of hunger also reduced. Less hunger was felt (12). Like this again it is seen at times or doesn't feel good eat something else, that's all like this. Again it is seen that eat 2 times, physically sick, for this cannot eat don't eat (17).

[Effort related to increased food consumption]  
what happened to me is when my baby gradually started to grow bigger, then whenever my stomach was empty the baby started to move a lot. As the baby used to move a lot whenever my stomach was empty I started to take extra food. It started from the 6th, 7th and 8th month. I mean whenever I got hungry, the baby started to move. Then I started to take additional food. I used to 4 meals a day then I added one more meal (16).



### **3. Pregnant women's experiences with nutrition supplementation programs**

#### **3.1 Cultural beliefs and perceptions**

##### **3.1.1 *Alga***

[Bad areas to avoid]

The eldest suggested not going outside (Ojayga kujayga). That was the bad/cursed area. No one wants to go there alone. It is not better to go outside, far from the house at midday and midnight (35). Usually we do not go outside. There is a pond near our house. So we are not supposed to go around. They said, why would you go outside at midday, if anything bad happens? Elders say, we should not go outside (9). Say I have gone to pond side in the evening. Then bar don't come in the evening. Come before this (11). I didn't go to the pond or under bamboo tree at evening (39). One can't move through any bad area during pregnancy. There is a rule that women should be away from the graveyard at the distance of 45 hands (37, 4).

[long distance to CNC]

It was so far from here like about one mile (2). I have problem in going I didn't go, those who had no difficulty in going and bring, delivered at residence. Means a little far that's it, that's why being daughter in law couldn't go, then delivered at home that's it (10). What problem think that today Pushthi will be given in the morning a little far there was problem in going. Used to go with difficulty in walking (15).

[Going out is generally restricted]

I did not go here and there that much. I did not take any tension. I took my food properly.... I told you that they (family) did not permit me to go anywhere. I did not go...Mother-in-law prohibited me to go (2). She [a pregnant woman] cannot roam around (4). Say for example, going to various places, far away fields, going out in the afternoon are forbidden (8). I do not go in this way. We stay near at home almost always... She said not to go out, walk slowly and little, not to go in front of others (9). Can go alone if permitted and if not then do not go. Alone? No I never go alone.... I didn't go anywhere, how I will follow the Norm, I am in the room, think room and the yard. If I went anywhere now, like in the Noon if went out it will be detrimental, will not go, this is, so I except work at the fire place in the house (11). [Elders] said do not perform any heavy work, be at rest, don't go any where, otherwise you have passed a lot of trouble, those were told by elders (19). I didn't go far from outside, or anywhere. I had to maintain a lot. I didn't go far and also didn't go anywhere in the early morning and in night. Usually I tried to stay in my own room (20). Now in this condition going anywhere from home is restricted. Not to go anywhere. Will not detriment occur? So that I do not go to any place in transport. Do not go in any vehicle. it will be detrimental if go (24). Then, my maternal uncle called for my mother; she went to my grand-father's house. So, before she leaves she advised me not to go out from home. I didn't go out. Starting from becoming pregnant. One must hide her head with cloth and must be more cautious about her movement (37).

##### **3.1.2 *Allah***

[Practicing fasting] Think can occur. I do not think any one of these. Allah will do whatever is required. Isn't telling too Allah, that this offering Namaz, keeping fast, again doing Ebadat Bandegi, let if Allah says.....Lord of everything is Allah. Allah can put in trouble also can save (11). Allah's wish is my happiness. Allah can take live. Can cut also, can do everything, we cannot do anything. Offer Namaz and keep fast what else to do (17). Then "saman" that son was in my womb. Then it was the month of Ramadan. In the month of Ramadan I did that, in the night, isn't potato there? Fasted despite eating this potato. Couldn't even eat properly. Then fasted that's it. Now also keep fast, then also was. One month sited as an example, one month is fasting, and rest of the period is not fasting. Not during Ramadan, during Ramadan didn't eat Pushthi (19).

[Offering Namaz]

Said whatever is required Allah will do. For everything depended on Allah. Prayed to Allah through Namaz. For remaining well so that everything Allah does in good state (feeble). So that Allah does the, that during delivery there is no problem. That's all (12). Used to pray that is there. Prayed after offering. Namaz. So that Allah makes it easier for me. Take away troubles of sort. Think that baby is born normally. Or so that baby remain healthy. Is not there, many baby after birth have sickness, again mother

may have problem also, at times mother also die, cannot there many problems (10). Allah's wish is my happiness. Allah can take live. Can cut also, can do everything, we cannot do anything. Offer Namaz and keep fast what else to do (17). Doesn't it occur? Thoughts do occur. How it will happen good or bad way, it is in thoughts. Bad way means, say, if the birth delays then one has to go under ceaser. If the luck is good then normal delivery takes place. May Allah keep in good condition, Allah is everything. By offering prayer people pleads to Allah (8). Pray to Allah, so that Allah gives a healthy baby, always pray. For myself pray to Allah, so that Allah passes away danger in good stride, also that I do not have a danger as well the baby (13). I prayed regularly. I had always remembered Allah; I prayed to Him that as He had given me child then He might allow me to deliver my baby without any problem, so that I wouldn't have to pay money for that; That He cares for a poor like me (39). Think can occur. I do not think any one of these. Allah will do whatever is required. Isn't telling too Allah, that this offering Namaz, keeping fast, again doing Ebadat Bandegi, let if Allah says.....Lord of everything is Allah. Allah can put in trouble also can save (11). What bad thinking, I have only prayer to Allah so that Allah bestows a healthy and energetic baby (14). Read, whatever you will ask from Allah....was in trouble, Allah send relief from trouble. Think what born, how it born. People now fall in trouble when baby is in womb. Danger means if now baby born if anything happens, if someone becomes sleepless these thinking comes. At times baby dies also, children are there, so many things come in thinking. His father tells you do not think, do not take tension. Consoles tells do not give in to fear, Allah has given the hurdles Allah will send succor, offer 5 times Namaz and pray to Allah, Allah please rescue me intact. Means to pray to Allah so that take me intact (15). I was worried about the normal delivery or what if the baby gets stuck. Many babies die during the delivery. My baby had a big head, what if the head gets stuck or any accidents happen. I had these sorts of tensions. I used to lie down or sit with others and chat when these thoughts came. Tried to join with others and make my loneliness go away so that these feelings do not come again. There are times while lying down I had this thought and sat up right away. I used to say prayers. I used to pray 5 times a day, read the holy Quran and other prayers. I prayed to Allah that please keep my baby healthy, don't give it any problems and please keep it safe. I used to sit in the prayer and keep on chanting this (16). I was about this child, as I had two miscarriages; I always prayed to Allah that He keep my child healthy and sound. I used to say prayers more. I was always worried that I had done any heavy work for which I could have an accident (19). I expected nothing prayed Allah whatever you give let it be healthy. Maybe in inner soul longs would have been happy, even after that prayed Allah whatever you give let it be healthy. I do not want anything (19). I just prayed to Allah so that the baby become healthier and took my food regularly. I would pray to stay well. I prayed to Allah and took my food regularly (25). If people pray to Allah... Allah's will is all. Everything happen by Allah's will. Human being is nothing. Who has created me, without his will, how can I move from here? I pray to Allah so that I stay well (26). I saw some baby born with a lot of difficulties, so I prayed to god so that my baby gets birth with good physical condition (27). I believed in that if one worked there would be no problem with her health. I had always sought help from Allah that He never put me in trouble. Always I prayed to Allah (39). God will do whatever he feels right for me and I believe in providence. What should I do or ask? I offer Nafal And Hazateen Namaz (prayer beyond mandatory five times. Assuming that I have no money, I cannot fight the odds.

### ***3.1.3. Belief concerning big baby***

[As a women eat more, the baby will be big]

Who can eat more their bay born is fatter. Troublesome in delivering (giggles). Many say that eats so much how large will be the baby? There will be trouble at the time of delivery (12). The elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery. The elders say that by feeding nutrition they make the baby big inside the womb. They think that if I take the vitamins, the baby would become bigger inside the womb and it will cause problem for the delivery (16). Many people told that if mother ate much then fetus will be big in size and arise trouble during delivery time (27). Yes, sometimes. I was asked because if I had eaten more then the size of my baby would be bigger. Then I would face problem during my delivery (39). Earlier people is to say (voice wanes), during mother and aunts. If one takes more food size of the baby becomes larger. Baby is harmed at the time of delivery, mother feels uncomfortable? Mother falls ill, they said that (6). At parental abode they used to tell that for eating that after eating Pushthi the baby will remain healthy. Baby will be big. Neighbors who gave Pushthi said so (19). I am thinking, due to nutrition intake size of the baby increased.(40)

[Women did not believe in the big baby belief] Nobody eats less, like take it that she eats like herself, take for example I cannot eat, like this every one is like others. Many say that eats so much how large will be the baby? There will be trouble at the time of delivery, take my sister in law is fine, they say how large would be the baby if eaten more? I say that one should eat as one can, now you can eat you can eat, you have desire, won't you eat then? (12). No. this is not heard this days. Previously people is to say lie this. Earlier people is to say (voice wanes), during mother and aunts. If one takes more food size of the baby becomes larger. Baby is harmed at the time of delivery, mother feels uncomfortable? Mother falls ill, they said that. And these days say to take more food, that will keep baby healthy, mother will remain healthy. Again baby will be smaller (40). We do not do anything like this (14). Do not do this or try to eat properly, so that baby will be nutritious.(15) No. I ate as much as I can (25) Who eats a lot her baby will be strong and healthy. Mother will be well and her baby will be good in health. If eats good food? There is nobody here to follow this rule. Mother will be strong, mother will not be weak, baby will be good and strong. No I did not follow this rule. (26) If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby

also gets weak, that's it. (11) Long before these is to be followed (sound diminish). Later ones, which one----- (sound diminish), which one, Rabiul or Rahman, went to parental abode, one said that's all. No. I do not believe--- They used to say, I used to listen--(sound diminish). Ate if got otherwise not (40).

[A big baby could mean a healthy baby] If mother ate much then he child grew better. It's not better- if fetus is so big. I eat what get. I gave strong baby. Big and strong. I always give strong big baby. Not so much pain I felt for it. I have three children. Everyone was born well (36). Who eats a lot her baby will be strong and healthy. Mother will be well and her baby will be good in health. If eats good food? There is nobody here to follow this rule. Mother will be strong, mother will not be weak, baby will be good and strong. No I did not follow this rule (26). And these days say to take more food, that will keep baby healthy, mother will remain healthy (40) Take people eat, so that the baby is a little Pushtha, is energetic, born like this. Again who can eat more their bay born is fattier (12). The elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery. This is what the elder people say, and we think that if the baby is healthy inside the womb then it will be healthy after it's born, it would not get sick. That's our opinion, but the elders say that by feeding nutrition they make the baby big inside the womb (16). At parental abode they used to tell that for eating that after eating Pushthi the baby will remain healthy. Baby will be big. Neighbors who gave Pushthi said so (19). It is said fruit keeps the baby healthy. Baby born is voluptuous. Is fatty (8). It's proved that because I had taken the nutrition my elder, 2nd and younger daughter were born weighting up to 4 to 4 and a half KGs. And by the grace of Almighty Allah those babies didn't get that much sick after they were born (16).

### ***3.1.4. Perception on appetite***

[Couldn't eat due to vomiting during early pregnancy]

Could not eat in the beginning. I used to vomit then couldn't eat. I think 4th and 5th month then drop. On vomiting I didn't eat anything. Means throat also got injured.....(10). At that time could not eat for three months. One time in whole day could not eat. After baby came in the womb the vomit came (15). Means at that time when baby was in the womb food entered stomach and vomited that out, this. During pregnancy anything that I ate used to be vomited out (17). I couldn't eat much during the first 3 months. From the time I could eat, I ate. I didn't feel good to eat, I felt vomit (19). For three months I didn't even take water. I meant did not take it over than to vomit everything. Then after five months it became ok (20). I did not eat naturally at the first three months of the pregnancy period. I felt vomiting. After then this problem was over and I ate everything naturally (27). I eat 2 times a day sometimes 3 times a day. When I have conceived, in the initial stage I couldn't eat and I just only vomited. Now, I can eat little (37). I was not able to take that much food on that time (during pregnancy). A: I felt vomiting (41). During my pregnancy, I am not able to eat. A few days..you know..say..A few days, I took only water of rice. I smashed rice with water, and I took only water. Because I am vomiting (means she cannot take any other foods). I am vomiting a lot. I am not able to eat that much, which previously I can. Now I am eating less (38). That time I didn't eat much. Every time I feel vomiting if I wish to take food. I tried to eat often. I always tried a small quantity of food with at intervals (20).

[Poor appetite during pregnancy] Absolutely since this baby was in my womb I cannot eat (11). Couldn't breath. Felt very bad physically, physically remained good if eaten small quantity, that's it. Ate smaller quantity. Eating is not liked. Did not feel like eating. There is no other reason. Did not feel for eating. It was like this for 3/4 months, it did not feel at all for eating. Who can eat it more that's it. We couldn't eat, that it doesn't appeal to eat. We couldn't eat at all, it doesn't appeal, cannot eat, cannot eat at all, all through (12). It didn't increase much. I mean I didn't have much appetite. It was the same about the elder one too. Didn't have much interest for food (16). Like this again it is seen at times or doesn't feel good eat something else, that's all like this. Again it is seen that eat 2 times, physically sick, for this cannot eat don't eat. Change! What change? In the meantime could not eat anything, eat---could not eat. Didn't feel, didn't eat. Felt bad meant didn't eat. Couldn't retain anything after eating didn't eat (17). When felt taste eat more, when didn't feel taste ate less. When the baby was in womb could eat less why don't know did not get taste. My weight didn't increase Apa. My baby was born only 2Kg 700gms. I do not know why there is no taste. Means didn't feel much hungry after that could not eat much of it. Didn't feel taste. Actually I didn't feel much hungry and taste was also not much taste. Didn't feel good and didn't feel hungry as well (19). I eat what I get. I eat less than before. I did not feel interest (36). I used to eat more before becoming pregnant but after that I eat less. I don't feel anything tasty, and that's why I eat less (39). I ate before. In this condition I have no taste in my tongue but I take food twice in a day (26). I ate less during the pregnancy period. I lost the desire of food. It was dependant on situation- sometime I felt better and ate more and sometime ate less (27). At that period I could not take food easily. Did not feel like taking (40) Many people say that normally a pregnant woman feels hungrier than normal time. But, I don't feel so. Sometimes I feel hungry. Sometimes I do not. (37).

[Reduced urge for food due to fullness after eating Pushthi]

Means no, change in my eating due to eating of Pushthi, if Pushthi is eaten then urge for food doesn't remain, hunger doesn't die away, then eating will be certainly less. Urge is less for food (19). After eating Pushthi ate less other food. Because stomach remained filled up, there was no urge for eating other stuff (18). Say due to eating of Pushthi other food intake reduced, feel of hunger also reduced. Less hunger was felt (12). It was ok at first. But in the end I used to feel like my tummy is stuffed...didn't

feel like eating anymore. It used to make you feel full even if you eat little (16). What for because stomach filled up after eating this. Felt filled up. Reduced a little (17). I could not eat rice when I took the Pushti there and when I took it at home, I ate it after eating rice. If I take this .... It is Pushti... If I drink water after taking Pushti my stomach becomes full (25). When I took Pushti, I was not able to take another foods. Whole day, I could eat another thing. Say, on that time, that was less food. Because if I consumed Pushti, my stomach was full (38). As I ate nutritious food. I couldn't eat after taking the nutrition (Pushti). I don't eat. Can anyone eat after eating the nutrition (Pushti)! It fills ones tummy. Someday, I didn't eat at home even (39). During the time when I consumed Pushti (nutrition) I took less food (other foods). I took Pushti (nutrition). I took Pushti (nutrition) so I consumed less rice. Sometimes I dropped one meal because I took Pushti (nutrition). I took only Pushti (nutrition). After sometimes I took food. When I took pushti (nutrition) it filled my stomach (41). After mixing the nutritious food used to be so much. On taking this the urge for breakfast used to wane. Crave for anything used to die away (6).

[I did not eat enough/I tried to eat more] I mean like I didn't take any extra food. Like many people normally eat  $\frac{3}{4}$  times a day and when they get pregnant they take food  $\frac{4}{5}$  times a day. But I was not like that. It's like after the baby came into my womb the amount decreased (16). When the baby was in womb could eat less why don't know did not get taste. My weight didn't increase Apa. My baby was born only 2Kg 700gms. I do not know why there is no taste. Means didn't feel much hungry after that could not eat much of it. Didn't feel taste. Actually I didn't feel much hungry and taste was also not much taste (19). When I visited doctor during the pregnancy of my son (previous child), then I didn't have any problem to move. The amount of food I could before my delivery, I can't eat that much now. Many people say that normally a pregnant woman feels hungrier than normal time. But, I don't feel so (37). I am not able to take much food. I cannot take that much food, but I want to. I am able to take that much food. But I want to take various types of foods. I want to try. I tried but I am not able to eat now. My husband also tried. He is not angry (shouting), but (he is saying) I need to eat more. If I am able to eat more, I will be fine and my child will be also fine. Will be good. For that reason, my husband did this (38). Used to eat 4 times, 3 times, actually it doesn't feel to eat, even than forcefully ate something (14). Why did eat? If didn't eat then became weaker. Couldn't breath. Felt very bad physically, physically remained good if eaten small quantity, that's it (12).

### ***3.1.5. Other beliefs and perceptions***

[Pregnant women's strategies to be strong and healthy] Who eats a lot her baby will be strong and healthy. Mother will be well and he baby will be good in health. If eats good food (26). If I ate much than I will be strong and that is better for both- me and my fetus (36). Eating more food will give strength to my body. Will have energy, blood will form (40). They said me, "you will have to eat frequently, and it will help you to remain healthy." (38) For getting strength and getting energy. They said from hospital that if you take more food, your fetus will be healthy and you will get energy (9). No, there is nobody here to follow the rule. Mother will be strong, mother will not be weak, baby will be good and strong by eating more (27). They said me, "you will have to eat frequently, and it will help you to remain healthy." Health condition doesn't remain the same. During my first pregnancy my health condition was different. During my 4<sup>th</sup> I have become weaker gradually, haven't I ? (5) If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it (11). If didn't eat then became weaker (12). Now my mother in law tells, if not eat or if not do anything says "eat else you will be weaker, cannot do, cannot move", my mother in law tells like these (15). Now this has come in the womb, then it was seen that for many days could not eat, or vomited for many days or was physically for many days, weakness was there (17). They suggested as because I am weak and suggested to eat more and told about the delivery that it could be better to do it in Hospital (35). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave that tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my delivery will be safe and my fetus will be intelligent (25). Mother-in-law told that it is better for health. They served it at your house. It helps you to be strong. It is better to eat Pushti and it helped baby to be strong. Those who got it, is much strong then the others (36). Taking for weak physique gave from here. If this is taken then the body will not be weak and feel hungry that's why you are taking? (15). Good that weak in physique, then anemia, otherwise also baby is in the womb. Before birth of the child. Earlier also thought that sick, weak, will have little energy after eating these (19). One day she told me. I asked her "apa (sister), what does it happen if I take it?" she told that it clean(dirt free)his/her bloods whose health is weak (2). This they administered Pushti for weakness. They say that they give. It is given since you do not have blood in your body or giving for weakness of body (17). By taking vitamin tablets, mother doesn't become weak. Mother remains healthy (24). If I physically feel weak then they give Vitamin that red tablet. Take that I am weak, physique is weak. Take because of weakness (8). They tell think if this(supplement pill) taken then physique will not be weak and will feel hungry (15). That we do not take medicine properly for this we do not have breath, get exhausted slightly, other's *Bou (wife of son)* are strong enough, we do not take medicine properly (18). Physical tiredness, weakness, all these are manifested during pregnancy, when those symptoms are observed the mother is advised for hospitalization. if one is weak, frail, body ache then required medicine will be procured by patient themselves (40).

[I tried to eat nutritious foods during pregnancy] I maintain good work (meaning keep regulations). I didn't do heavy work. I took good food (meaning nutritious food). I took my food properly. I was pregnant so I took some good food. I was pregnant so I took some good food. Like milk, eggs and sometimes fruits. Apples, (grapes). When my date over (giving birth time passed) then I

went hospital. Before I gave the birth I took fruits (2). For remaining healthy, to take a little rest, take right food (6). Good, so that it remains good and have proper Pushthi. Be nutritious, baby is fair, black. Good food are required to be taken for good health, that's it. (8). I ate vegetables, such as some type of spinach-kachu (aram), Lal and Pui etc. To get nutrition. Nutritious food makes blood. Anemia goes away. I just prayed to Allah so that the baby become healthier and took my food regularly. I would pray to stay well. I took food regularly. I ate several kinds foods now and then. I prayed to Allah and took my food regularly I was mainly keen about my feeding and took food in a short interval, ate apple grape and other foods. Say fruits like apple. CRL's Apa came in every month. And doctor suggested to eat good food, milk, egg and not do any heavy work (25). Better something. I ate the nutritious food. I tried. Sometime ate fruits. Sometime ate grape, milk, eggs, but very few time. Now I also tried to eat fruits (27). I used to drink plenty of water, I didn't do any heavy work, I ate plenty of green leafy vegetables, eggs, milk and fruits etc. That I ate fruits more than other time. Fruits even eaten in other times ate a little less. During that period ate a little more. Ate more considering own physique again baby would be healthy. I was of a little frail health, I myself will get a little energy. (19). This sweet Gourd. Then potato, good fish, leafy vegetables, tells to eat all (24).

[Nutrition supplement was considered nutritious] In case of my eldest daughter(during pregnancy)...Pushti (nutrition) has many pushti (nutrition).. On that time me and my sister in law(brother in law's wife) both were pregnant . So we went both (2). It's good to eat nutrition, It gives extra nutrition (5). I think if I got vitamin tablet, my health was good and my child also be good. Through taking vitamins, I will be good (or healthy). It had impact. Child also got Pushiti. (1). It will meet the Pushthi requirement. On taking Pushthi the baby remain healthy. Remains nutritious. Again I also remain in good state, Pushthi (8). They considered beneficial. On eating this benefit will occur, if Pushthi is eaten will be good. Baby will remain good, nutrition will occur to baby. Mother will also get nutrition, gave for this (10). Because if I had 4 meals at home and nutrition with it, the nutrition would count as extra food. As a result it was good for both mother and child for the nutrition being an extra meal (16). Pushthi's effect is there, Pushthi is Pushthi for this reason baby born was large (18). Pushthi is Pushthi there is full Pushthi of it. If this was eaten baby used to grow quickly, mother's weight also increased. Good for baby and mother both. Because used to understand that this was very important for mother and baby, better than other food, more Vitamin they considered beneficial (19). Ate so that in body.....considering this ate that in Pushthi there is energy, ate. At times could not take. When felt good could eat. Strength---the Pushthi is nutrition. Pushthi is one kind of energy of body. So ate that for this reason (19). It was a nutritious food. It makes the body healthy. They thought it was a nutritious food. So, it would be better for my health (27).

[Food related proscription for pregnant women]

That if chili is taken then the baby will be an angry one (6). Pineapple is not eaten when baby is in womb (10). If baby is delivered at home a lot of edict have to follow, do not allow to eat fish, do not allow to eat hot food, have to eat selectively (14). I followed such rules in case of fishes, what do you call it...Mrigel Fish. Mrigel (16). Didn't eat Pineapple. Harm occurs if eaten for that. Many said Pineapple cannot be eaten after that I didn't eat (19). I did not eat pineapples. Pineapple is a poison (20). Like in pregnancy Pineapple cannot be eaten (24). I ate papaya sometimes, but didn't eat pineapple. I do not eat pineapple usually (25). Yes, I do not take pineapple. It was not restricted at other time but should be careful at pregnancy period. God forbid, any baby in the womb may die for eating pineapple. It may die. (26) I did not eat pineapple. Allah gives me a child that is son or daughter that's not more important. But I tried to avoid the food that could be harmful, such as Tamarind. It is too much sour. It could be made dysentery. I also avoid the chilli, because I had gastric problem. I did not maintain such restriction. Again someone suggested not eating coconut, it made eyes white (27). Many people did not eat pine apple. It is harmful. It is harmful for the fetus. Everything can take except pineapple (36). There is nothing forbidden, only pineapple. One can't eat pineapple during pregnancy (37). Chili, taking chili would harm the fetus Yes Becomes less angry, if you take chili, the baby becomes stubborn type, all these (40).

## 3.2 Family's influence

### 3.2.1 Role of husbands and mothers-in-law

[Family's concern on food intake of pregnant women]

My husband said to take supplementary good like milk, egg (9). Husband used to bring, eat this eat that (10). Like he went to market he doesn't return empty handed he will bring one or the other thing. My husband wants the more as much as I can eat , it will be beneficial. For this he means more food----what I can eat is his subject. The item he will like will bring (14). (Husband) says. Eat properly, eat regularly. Brings. Eat this-eat that. That, fruits brings. Brings good items from bazaar when comes home (19). Well my husband, he suggested the better food, which one will be good for my health, looked after me, cared about my safety. He always tensed for me and called me over phone. My brother-in-law went there and he said that he will send money with other people. He asked about my feeding, and suggested to eat eggs and again sent fruits (25). Which I liked to eat at that time he gave me to eat - fruits, eggs and milk (27). Their father (husband) is also shouting (caring for). He brings something...for my eating. He

is not angry (shouting), but (he is saying) I need to eat more. If I am able to eat more, I will be fine and my child will be also fine. Will be good. For that reason, my husband did this. He told me to take more foods and also forbade me to do heavy work (38). Say he brings a jack Fruit, says take more, purchases milk and asks to take (40). He said take food every day what you wish. Sometimes my husband made “shorbot”(water with sugar and add some juice like lime). that was it nothing else. If my sister-in-laws or your mother-in-law cooked any good food they gave me (41)

[Family members thought the supplement good]

They felt good. They told me to go there. It was for my well-being. Through this, I could do better and my child also would do better. They liked it. They thought it good (1). They told good. when they gave me pushti (nutrition) they told me that it will good for me. Child will be getting healthy. They (family) also told me “take”. They told me “they have given you pushti (nutrition) . Eat it.” so all people comments were same (2). (Family thought) It’s good to eat nutrition, it gives extra nutrition (5). Family member feel good do not take it bad. Why they consider it good! My parent in laws are saying that their daughter in law (me) will remain in good health, my baby will also remain good, there will be no problem (7). They considered it good, that’s it. *Pushthi* eating will be beneficial. Baby will remain healthy (8). Good. They said all right. Eating this is very good that’s it (10). Do not opine anything bad, tells good, take. If you eat you will be able to go about, calcium will be in your body, there will be Vitamin, baby will be good (11). Viewed positively. They are giving *Pushthi* for becoming healthy. For well being of baby are giving, feeding this. Thought that eating was quite good. Perceived good. In case of taking Iron considered good. Will be good for baby, there will be blood in the body. Vitamin will be in body. Husband also felt the same, that if eaten there will be blood in the body. (12). Opined good. Used to say it is coming new will be good. Go eat and come back. Mother in law is there, Ja is there, Father in law is there (13). My husband viewed this positively was enthusiastic to feed me *Pushthi* (14). Mother in law view it positively. Tells eat. If they give what is your problem in eating? If it benefits you if Doctors give you take what is the problem? (15) They can see that if the mother takes it, it makes both the mother and the baby healthy, so it is necessary. They had this impression that in earlier days they didn’t take nor needed any kind of medicines to keep them or their babies healthy. They were healthy anyway. But now a day its cleat that if we don’t take vitamins we become sick and give birth to a sick baby. Only a sick mother gives birth to a sick baby. So their mentality has changed (16). They viewed it good now it is not given. People are good. Why, about this *Pushthi*? View it good, one thing if not harmful if good then good. You gave that from that side if not good did they gave bad thing to a mother any bad thing try to feed a bad thing? For benefit gave (17). They think that our daughter is sick she will come round if it is taken. Good that weak in physique, then anemia, otherwise also baby is in the womb. Before birth of the child. Earlier also thought that sick, weak, will have little energy after eating these (19). Said good. It used to be given from Government line, pregnant mothers ate, was good that’s it (24). They always supported me and say positive about it. See that doctors are giving *pushthi* for betterment. They thought it would be better as because it was suggested by doctor for pregnant mother. Why they would react negative? They always took it positively (25). They said that it is good for health. They said earlier as the doctors gave, it is good for health, it keeps blood clear, it protects many diseases (26). They thought it was a nutritious food. So, it would be better for my health. They had positive feelings (27). My family members, they did not know these so many things. They were aged persons. They did not eat these tablets. But they did not feel bad for my going to attend the training. They only thought that I should have to maintain the present updated rules (27). She told that it is better for health. They served it at your house. It help you to be strong. She expressed positive view (36).

[Family members supported pregnant women’s taking supplements]

They felt good. They told me to go there. If I did not want to take, they told me. If I forgot, they tried to remind me, “Did you take your pill? Go to take your pill.” Because of my well-being (1). How I could consume *Pushthi*, they (family members) told....When they (*Pushthi* Apa) gave me oil, mixed grinded “Dal”, and “Gur” (juice or date-palm in the crystallized form), when I took it to home, my mother-in-law told me to add some bananas and milk (1). They perceived as well. Told its good take it. Everyone told this. They told (family)it is good. Take it. What is the problem (means no problem)? These are not bad. This was a mixture of powder of rice, powder of dal. So it is not bad (2). They told me “take it” If I took it will be better. When they gave me *pushti* (nutrition) they told me that it will good for me. Child will be getting healthy. Child will be healthy. Health will be good. Child’s. Child will be healthy (2). If they made any mischief I did not take. They (family) also told me “take”. They told me “they have given you *pushti* (nutrition) . Eat it.” so all people comments were same. so what could I do(means - that’s why I took it) (2). Used to say for taking. Since given for betterment, take it (6). That to mother-in-law said for going, eat, this I have listened to them, ate, went (8). They said to eat. They said that the *pushthi* is for good. My family members said, why don’t you eat it? You take it. Do not throw it away. My mother in law (9). They said for eating (10). Then husband also said “eat”, “eat” (12). (Mother-in-law) Used to tell go, eat and come back, eating this will benefit you. Opined good. Used to say it is coming new will be good. Go eat and come back. Mother in law is there, Ja is there, Father in law is there (13). My husband viewed this positively was enthusiastic to feed me *Pushthi*. Consider the well being of baby, considering own health ate. Husband is angry. I had to eat what he wanted. For being healthy. And involvement of my husband is more. No problem is occurring to me. My husband wished more that’s why I used to eat *Pushthi*. He used to think that after eating I will remain healthy, it was his desire how to keep me healthy (14). Allowed to eat thought that “it is good for you, on eating this benefit will occur, you eat, what is the problem” (15). What they would say, it is an eatable so ate. What will say (17). Tell to eat. If not eaten admonish me. If I do not eat then “ why don’t eat”? They have given for benefit. “ didn’t give for detriment. Eat” Have to eat say this. Mother in law says. Or his father so long he was alive said. Always they said . never they forbade me. They say to eat. The direction in which ICDDRb’s sub centre is located, tell me to go, go to doctors. They never ever restricted me from going (17). At parental abode

they used to tell that for eating that after eating Pushthi the baby will remain healthy. Baby will be big (19). They think good, if I forget to take they bring and give-good medicine take it (19). They (family members) always suggested eating it, but I did not for the bad smell (20). They tell to take it, it is good for the fetus. They all said it My sister in law said (26). They thought I should eat it. They thought it was a nutritious food. So, it would be better for my health (27). They advised to eat. It is better to eat Pushthi and it helped baby to be strong. And that's why I ate it (36). Used to go for an hour, came back after getting, then my mother in law and Ja did those job (13). They served it at 9-10 am. Sometime I completed my work and also ate rice before going there and sometime I went to take and my mother-in-law managed the rest of the work (20). Household chores? My mother-in-law helped me. My sister-in-laws were not at that time (25). I tried to finish my every works and sometime did not. But that did not make any serious problem. My mother-in-law can handle the rest of the work (35).

[Permission of family members is needed]

If not if he does anything out of anger. Nothing can be done without permission of husband (14). Then could not go all the places according to my desire, permission of elderly is also required, their daughter in law, the way they say have to remain (17). That's an important matter. I can't do anything against their will (37). My mother in law allowed to go. Go, eat and come back (13). Used to go after getting permission from mother-in-law. Problem does arise but nobody told me anything. Despite my hundreds of job I was allowed to go else my husband used to be angry. Everybody is afraid of my husband. Nothing can be done without permission of husband (14). I told you that they (family) did not permit me to go anywhere. I did not go (41). Can go alone if permitted and if not then do not go (11). I don't ever follow this. But sometimes I have to do as they say. Sometimes when I intend to go out around 12 or 1 o'clock, they don't allow me to go. What can I do, I have to listen to them anyway. I wait a while and pass that time and go after that (16). Assume if husband stay outside even then everything goes according to him (15). Husband took the decision. Who else will look after, none is in the home. Of husband's one. Most of it of husband's. Will not husband's one appeal, husband is all the time, that is. Husband is always in thinking in tension so if not husband then whom? (12)

[Husband decided whether participate in the program or not]

If he (husband) orders then will eat (Pushthi). (He) allowed to take (11). (Husband) Allowed (me) to go. Then husband also said "eat", "eat". Say, listened to my husband, again they also said (12). My husband viewed this positively was enthusiastic to feed me Pushthi. Consider the well being of baby, considering own health ate. Husband is angry. I had to eat what he wanted. Husband wished more that's why I used to eat Pushthi (14). Husband says for taking (40) (Husband) Allowed to eat thought that "it is good for you, on eating this benefit will occur, you eat, what is the problem". (15)

[Family members did not let me go for the program]

You thing is not it troubling in going and coming. Think that do not we go to a place frequently, as wife of Huzur (religious Leader) near the house (feeble voice) stay. This was said by my Husband as heard. Later he said then went. When (he) debarred then (I) did not go. It may be on any day. If work was there or (if I) had more of commitment like that everyone got together in the family.....for that (he) thought and said for me to hang around, then I didn't go that day and went the next day, like this (11). I mean not every definite day...if there was any problem at home I used to miss visits. I used skip that day. It's like suppose I had some household chore or suddenly a guest came, couldn't go then...that sort of trouble (16). If they disagreed I did not take (41).

[Mother-in-law's views on nutrition supplements]

The people of old age they said what is the necessary to take the tablet? We did not take, what is wrong with me (26). Oh! My family members, they did not know these so many things. They were aged persons. They did not eat these tablets. But they did not feel bad for my going to attend the training. They only thought that I should have to maintain the present updated rules (27). She used to make quarrel with the doctors or whoever tried to help me. She said that all those people have made me spoilt. She has also given birth but she didn't receive any assistance. So, I also should not receive (39).

### ***3.2.2 Economic status of a household***

[Poverty related concerns]

Sometime I felt anxiety because of my poverty. That means there are many types of poverty related things in my family. So I was anxious about these. Then I thought that the worst condition. I did not have that much money (2). For care or anything, money is needed, understand? Does everyone have this facility? I worried about that. But, I need money to fulfill that. Actually, I am not being able to do anything as I don't have enough money. My mother takes the decision. I do as my mother says and however my husband earns. We don't have income. So, we have to do as husband asks (4). What tension I had? My husband was unemployed in that time. I had two children. How will I give them education? Who will we maintain our family? My husband had no income. I had to thought like this (9). There is no ending of tension. How will I get food? How will I get clothes? They tell to go to the hospital for my betterment. Many women do not have food here, no doctor, no money, how they will run their family? (26)

[Economic concerns in relation to c-section]

Suppose...earnings of my husband is..if we go to hospitals then we need to pay the rent...that is a matter of worry...if something happens..Anything can happens during the delivery. Say they take knife...they do scissor operations. No one is having normal delivery. They are “delivered mother”...scissor or side scissor happens...or you have to go for knife (9). Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer (27). There is much expenditure for delivery. From, where would I arrange all those! I worried about it. I have never thought of it. I had my child before. Had I ever thought of scissor! (39) What else should I think? Whatever had to occur had occurred, think of anything ominous. Say, I may need operation, which may require a good amount of money (40). I had already two children. I did not want to have another baby. But again I took it (meaning became pregnant). So this type of thing (meaning C-section) happened. I was anxious because the date already passed. Then I thought that the worst condition. I did not have that much money. Child had not come yet. I did not feel any pain. Where I have to go....(41)

[Having a big baby might result in problems in delivery including C-section or Episiotomy]

About the whole program, the elders say that the nutrition packet make the baby big inside the tummy if we eat it, so then its difficult to have a normal delivery for that baby and it requires a scissor-surgery (16). During the pregnancy if we take medicine the baby may become big, that's why they don't like us taking medicines if we are pregnant. It would cause problem for delivery, it won't be normal and will require scissor-surgery, they comment like this (16). Again who can eat more their bay born is fatter. Troublesome in delivering (giggles). There will be trouble at the time of delivery. Doesn't the passage tear if healthy? For this reason many goes to hospital, doesn't stay at home. Assume many mother are like this that. And if one goes to hospital they deliver by applying incision in the passage. So that if the baby is born big (12). They took me to Matlab with their awn boat. They called for better doctor. We were just reaching Matlab and my daughter was born. They just pull me and took into a bed and God blessed me and my daughter was born. My daughter was big in size, so it had to cut in a side (35). I ate some more at before. I did not have any tension about this. I tensed only that if my fetus will be big in size then it could make a problem during delivery. Many people told that if mother ate much then fetus will be big in size and arise trouble during delivery time.(27) Yes, sometimes. I was asked because if I had eaten more, then the size of my baby would be bigger. Then I would face problem during my delivery. Doctors from the Siarel said that. I also knew that the size of my baby would be bigger and it would cause problem during my delivery. They used to advise me to eat less but I should eat frequently. (39)

[Women hope to have strong and healthy babies although the baby could be big in size]

If mother ate much then he child grew better. It's not better- if fetus is so big. I eat what get. I gave strong baby. Big and strong. I always give strong big baby. Not so much pain I felt for it. I have three children. Everyone was born well (36). Who eats a lot her baby will be strong and healthy. Mother will be well and he baby will be good in health. If eats good food? There is nobody here to follow this rule. Mother will be strong, mother will not be weak, baby will be good and strong. No I did not follow this rule (meaning eating-down practice) (26). The last one was less healthy. It was smaller in size (9) Take people eat, so that the baby is a little Pushta, is energetic, born like this. Again who can eat more their bay born is fatter (12). At parental abode they used to tell that for eating that after eating Pushti the baby will remain healthy. Baby will be big. Neighbors who gave Pushti said so (19). It is said fruit keeps the baby healthy. Baby born is voluptuous. Is fatty (8). Its proved that because I had taken the nutrition my elder, 2nd and younger daughter were born weighting up to 4 to 4 and a half KGs. And by the grace of Almighty Allah those babies didn't get that much sick after they were born (16).

[Economic concerns in relation to food consumption]

We have wants in my family. He brought his sister. Where we can't manage normal expenditure of our family, from where could we manage the extra expenditure? I told him all. Apa, really, we are in want. There is no rice, no dal. There is only want. I would eat then when there would be food in house. Sometimes I lied to them that I had taken food. There is wants in my home. What should we eat! (5) I didn't eat anything extra. What should I eat! There are many things like snacks, biscuits, breads, banana, egg are found in others home and so that they can eat. There was no money to buy that food. I have told you that if those were brought to home then I ate otherwise not. It's like whatever is available at home, I ate. If he brings fish today I will eat fish. Then, I may eat dal or vegetable. As my luck does not permit, cannot buy cannot eat. This people of the neighbourhood. Even if said to what benefit? Whatever is there in my house, I will take that, and will anyone give extra food? Who will give? (5) Since I am anemic, take food that much as it is ordained in my luck. I have taken when I have got them, did not take if, I did not get them (6). (feeble words)--- pregnant mother thinks just like that, or husband doesn't work, nothing is there in the house, tension arises (8). I cannot take always but whenever I afford I take. I eat breakfast at morning. At noon I eat rice. After taking rest in the evening I take puffed rice, then I eat rice at night. Biscuits and puffed rice as we are poor, what kind of food we can eat? (9) We do not get to see even Pineapple where from we will get to eat (giggle). Can eat think if brought then can eat (11). Since Doctor Apa advised to eat more good food said whatever can eat t to it that whichever my taste feels to eat that, poor person whenever can bring anything eat (15). Where to eat from poor person, of poor person---- What measure should I take to remove *Afa*? Poor person. Now there is nothing that-----nothing is there that now that will go to Lady Doctor after that bring beneficial medicine or there is no such money to buy this or that for eating (17). That can be followed, milk egg can be eaten but don't you required to have money, for want of money cannot eat. They advise for benefit (18). Again sometime ate egg, we are poor people had to cut according to cloth (19). Not so much. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (20) Every food is permitted but not in my fate. I wished to eat many things but ill fate. I wish I eat everything, I want to eat good food. If we don't have how can we eat! (26) No. Sometime ate fruits. Sometime ate



grape, milk, eggs, but very few time. It's not so easy because we are in a joint family. Accept this; my husband did not earn much. Again we had a tension to manage the money for sizer. I tried to eat more for my child's safety (27). I am very weak. I felt it every time in my daily life. My body trembled and I felt dizzy when I tried to stand from sitting. What can I do? We don't have money. I have to eat nutritious food, but how could I manage money? (35) What can we eat, we are poor. We have also a lot of family members. Not so much. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (36).

[Taking nutrition supplements will make the baby healthy and strong]

It's good to eat nutrition, it gives extra nutrition. Advantage! What type of advantage it could be! For that, baby becomes healthy. (5). My body could get iron. Baby would be in healthy condition (5). If mother gets nutrition then baby will be healthy, mother will also be healthy, get nutrition, get a little energy. Feel the baby will get nutrition, mother will get nutrition. The baby will remain healthy, or remain good, will have energy. Will have energy, blood will form. Fetus will remain healthy, it will be healthy if the mother is healthy. Baby will be also healthy (6). I am taking, so that my baby remains good, I also remain good (7). It will meet the *Pushthi* requirement. On taking *Pushthi* the baby remain healthy. Remains nutritious. Again I also remain in good state, *Pushthi*. Baby remains good, becomes fulsome (8) They considered beneficial. On eating this benefit will occur, if *Pushthi* is eaten will be good. Baby will remain good, nutrition will occur to baby. Mother will also get nutrition, gave for this (10). It is said that if it is taken it produces blood in the body, then strengthens that's it. So that the baby would born healthy. Said that baby born will be healthier if *Pushthi* is eaten. At the *Pushthi* center they said to eat *Pushthi*, baby will be healthy, my health will also remain good Assume if *Pushthi* is eaten, thought that the baby will be healthy. Will be healthy. Will have strength (12). Will be good for baby, baby will be wholesome, will be healthy. Can understand if you say elaborately, everything is but good, even then have to tell elaborately (13). They can see that if the mother takes it, it makes both the mother and the baby healthy, so it is necessary. They had this impression that in earlier days they didn't take nor needed any kind of medicines to keep them or their babies healthy. They were healthy anyway. But now a day its cleat that if we don't take vitamins we become sick and give birth to a sick baby. Only a sick mother gives birth to a sick baby. So their mentality has changed (16). To take the Nutrition (*Pushthi*), fetus will be healthy and strong, they also told these things (20). They advised to eat. It is better to eat *Pushthi* and it helped baby to be strong. And that's why I ate it (36). Say, I am not able to eat that much of rice. If I don't take enough foods, I need another type of foods to fulfill the needs (1). They said, doctors said those who prescribe they said. Don't remember. Take for that and we poor cannot arrange anything. If others deliver baby eat a lot of things, may be it helps develop brain of the child. That you think we cannot bring them clearly. Now this we have got free of charge, eat this (giggle) (11).

### 3.2.3 *Sharing the supplements with family members and replacement of home diet*

[Supplements were given to other people or delivered]

The *Pushthi* Ape delivered it sometimes to my house (1). They came and gave me or sometimes my eldest child went and took it. She went to the school and when she came back some days she picked it (*pushthi* (nutrition) pack.). If others took it sometimes they could not believe that I consumed it. They thought I did not eat. That's why some times I went and mixes those and ate. if I did not take it they send it to me by their people or they give it to my people. or I went and took it or they came to me to give. (2). But if I did not take it they send it to me by their people or they give it to my people. Or I went and took it or they came to me to give. Rest of the time they came and gave me or if they found others they sent it to me through them (2). Sometimes it used to be given for 2 to 3 days together. At times I used to take by going there, at times they had sent through someone. About system, one mother had to take one packet. It so happens that mother brings the pack home (6). The time I used to go, that time I ate. If I did not go then someone brought t that for me (8). I brought it by children or other women. They used to give to the child I sent (9). I have problem in going I didn't go, those who had no difficulty in going and bring, delivered at residence. Means a little far that's it, that's why being daughter in law couldn't go, then delivered at home that's it. I didn't go .Delivered at home from the start for this didn't go afterwards and eat. (10). But I did go most of the time. Sometimes it was like if I missed going there but my neighbor did, they used to send a nutrition packet for me (16). I went once only for giving weight. And after that they came to give. Always gave again the day on which they couldn't give for water or flood next gave it next day along with the days two together (17). Again sometime I sent someone to take it (20). My niece went to collect that. Whenever I felt sick, my niece went there to collect that (25). It was easy. My mother-in-law went there and collected it (35).

[Women were allowed to take out the leftover of the supplements]

I could not take the total amount. But sometimes I was able to eat the total package then I consumed the total package. If I was not able to consume the total package then they gave it (the rest of the food) to me. Only because I was not able to eat it (1). They gave it for three times a day. I consumed one meal and brought rest two meal (2). Then they ask me to take the pack at my home and eat later. I eat later (5). They used to say for taking that back home if one failed to completely eat. If I could eat full pack, I used to it else bring home the leftover (6). That is to be someday. Full-had to eat a little. After taking a little bring the balance (8). If given at *Pushthi* Kendra (community nutrition center) to eat I did not eat, brought home and ate (11). If could not finish then brought the remainder by hand. Brought along with by making (*Naru*) ball. (12). If not eaten, remained, means in the packet

there were too much, so could not eat the whole. At times could not take. When felt good could eat (19). I ate as much as I could, fed the left over to others, there was nothing to do so left it there (14). I made it a ball and hide it in my lap. Then took it and served others (20). I ate there and also sometime took it to my house. Sometime I ate it full in there and sometime could not and then took it to house. I ate it full with some interval (36). When I took it to my home and when I mixed everything, it was huge amount. I could not eat the total amount at one time. So often I mixed small amount of food and took it. I could not take the full package on this time (38). Never ate the whole, someday didn't eat! If someone cannot eat the full tells eat the half by mixing with water and take half to your home and eat again give to many again doesn't give to any one, let t be late sit down here and eat (15).

[Sharing food supplements with family members]

Say....I gave it to my mother-in-law and sometimes I gave it to my sister-in-law. I gave them little amount of food (1). Sometimes they brought at home, I ate at home with my children (5). I gave her (mother-in-law) the whole packet. I didn't give her the prepared food. If children are in front of a mother how can she help not giving them also. When they were around me or sometimes I kept for them also (5). Used to take and gave to children if they were around. Sometimes took alone, sometimes gave to the children. If the child comes to mother can mother take without giving to children? Since child comes near. Alone I could take seldom (6). That time fed the children, or gave to someone. Children of this home. Again children of this Nanad (8). Those who used to be present on my sides, babies etc gave to them. Father in law, mother in law were there gave them (10). Take when eating if anybody came or kids came may be I have given a small quantity. Husband mother in law do not eat. They are old person. May be given to children sometimes (13). There were even times like this when my kids were around so I gave them bits in there hands as well (16). Someday it was seen that could not eat or mixed it could not eat then it was of no use throwing away. Gave to someone who ate it (17). Sometimes gave to mother sometimes ate myself. Children those who are in the house fed them. Gave to brother in law, elder brother in law had son fed to him (18). Gave to Brother and sisters (19). Sometime, I took it and made the mixture, then they also ate it, their children and as well my cousin and their children also ate it. I served it to my mother-in-law. (20). Sometimes I gave it to my niece, but she did not always agree to eat it (25). Sometime if they (my daughters) were standing before me (36).

[Shared the supplements with others or throw them away]

That time fed the children, or gave to someone. Didn't feed own child, that's it. Gave to other child. Again other----(interviewee talks) (8). Is there shortage of person to eat, everyone is mad for eating that, if I couldn't eat someone ate (18). I gave it to others also. And sometime took it to divide two times (35). I gave it to hens or geese. Sometimes I gave it to my cows. If I was not able to take the full packet, what could I do? (1) Gave to cow. Gave to children after diluting (8). Someday it was seen that could not eat or mixed it could not eat then it was of no use throwing away. Gave to some one who ate it (17). I threw it. One wanted to eat. No one felt any interest (27).

[Replace home diet with the supplements]

When they gave it to me at my home, I did not eat it on that time (1). During the time when I consumed pushthi (nutrition) I took less food (other foods) : I took pushthi (nutrition). I took pushthi (nutrition) so I consumed less rice. Sometimes I dropped one meal because I took pushti (nutrition). I took only pushthi (nutrition). After sometimes I took food (2). I ate less as I would eat the nutrition (pushthi). Home-made food? I ate that less (5). One meal used to reduce. That reduced, did not take breakfast, took rice (6). I did not drop it, I ate it after sometime. I did not eat it full in a time (25). Say due to eating of *Pushthi* other food intake reduced, feel of hunger also reduced. Do not eat by sharing. Take that now do not feel, eat after sometime. When food in the stomach receded then ate (giggle). After a while took that remainder. (12). I ate less at that time for eating Pushthi again other time when felt hungry then ate that food (13). Ate less that's it, for eating the Pushthi, ate rice a little that's it. That you think ate rice if Pushthi was given a little later, and if didn't eat rice ate Pushthi that's like it (15). This the Pushthi-this is good quality lentil. After eating this eating rice is not possible always. What for because stomach filled up after eating this. Reduced a little (17). After eating Pushthi ate less other food. Because stomach remained filled up, there was no urge for eating other stuff (18). Then I couldn't eat more food. Change came. Then I used to eat absolutely less food (19). I did not eat the similar as I ate Pushthi also. It was also a sort of food for me (35).

[Too much to finish at one time – replacement happened for several meals]

Whenever I wished. Sometimes, I took it in the evening and sometimes I took it in the morning also. When I took it to my home and when I mixed everything, it was huge amount. I could not eat the total amount at one time. So often I mixed small amount of food and took it (1). Says one packet dal, one packet rice and another packet gur. Then I divided these things several portion and took it. They told me that I could consume two portions at a time. Then I prepared at a time and consumed slowly by small amount. Sometimes I took it at noon both the mornings and noon's portion. Some times for the time problem I was not able to take that's why I prepared once and took two portions in one time. During the time when I consumed pushti (nutrition) I took less food (other foods). I took pushti (nutrition). I took pushti (nutrition) so I consumed less rice. Sometimes I dropped one meal because I took pushti (nutrition). I took only pushti (nutrition). After sometimes I took food (2). It seemed easy to me. Like, I didn't have any food at noon. I just prepared it and ate (5). I ate it at noon or evening. Anytime....Most of the days I brought it at home. I ate at noon or whenever I could manage the time I ate in that time (9). I used to eat in the afternoon. Rice ate in the noon

and in the afternoon ate Pushthi, some days ate in the morning also means no time table was there that's it (10). Sometimes ate in the Noon again sometime in the evening. Whenever felt hungry ate then (13). Ate a little, but then it was not eaten timely sometime at 12AM sometime at 1PM (14). Ate when felt hungry that's it. Think of bringing the dried portion that I brought, and one time ate after mixing with water, sometimes in the night if felt hungry ate after opening (15). Suppose in the evening. At noon I took lunch and around the evening I felt a little hungry, then I would dissolve the nutrition and eat it. It was like suppose I had breakfast in the morning and around 10 or 11 o'clock I felt hungry which is normal, then I used to take the nutrition, it wasn't a problem. Then again I took a bath and then had lunch around 1 o'clock (16). I ate it after sometime. I did not eat it full in a time. I could not eat rice when I took the Pushthi there and when I took it at house, I ate it after eating rice. (25). At the evening time. Just ate it evening and not take anything at the evening hour. I ate it in the morning. I ate it when I felt hungry (27). I ate it sometime in the morning and also night or daytime. Not any fixed time. And sometime took it to divide two times (35). Sometime I ate it full in there and sometime could not and then took it to house. I ate it full with some interval (36).

[I didn't eat or ate light food for breakfast]

I ate Ruti or rice. On that time, I didn't take full meal in the morning. I took light food. I purposefully ate less food because I had to take the food in front of them (1). In the early morning I did not take anything. I took pushti (nutrition) instead of breakfast. When I took pushti (nutrition) then I took for my walking (means- took small amount of food). And if I took rice more, I was not able to take pushti (nutrition). (2) After that I consumed pushti (nutrition). I took small amount of rice. I took small amount of food on those days when I went to the centre (2). Nothing at morning. Willingly, since it was given. After mixing the nutritious food used to be so much. On taking this the urge for breakfast used to wane. May be did not take breakfast took those (6). That day morning went without eating rice went at 10 O'clock, think didn't eat breakfast again ate Pushthi there after coming home again eat rice. Say in the morning if eat Pushthi then after eating rice cannot eat again cannot eat Pushthi (15). There were times when it would take 11 or 12 to go there. Then they used to stay there. Like I have already taken my food today so I am unable to have nutrition now, so I would bring the packet with me and when I am at home like this morning I would skip my breakfast and dissolve the nutrition and eat that instead (16). Took half breakfast, ate little that's it. If Pushthi is again given will eat Pushthi. Pushthi was one packet that was morning breakfast (24). Sometime ate again didn't eat sometime. Didn't eat too filled up and again didn't go empty stomach. Ate something light that can eat Pushthi after going there (13). I ate rice or muri, chira. Sometime I did, sometime did not. I ate less food than before when I ate pushthi (36).

[Even could not take more food]

When I took Pushthi, I was not able to take another foods. Whole day, I could eat another thing (1). Someday, I didn't eat at home even. As I ate nutritious food. I couldn't eat after taking the nutrition (Pushthi). I don't eat. Can anyone eat after eating the nutrition! It fills ones tummy (5). Then didn't eat anymore in the noon. After eating one meal cannot eat in other meal. Rises above (15). Said that, eat full stomach, after that come for eating *Pushthi* or eat less. During that time I could not eat at all, I didn't feel for eating. Even than have to eat (12)

### 3.3 Influence of medical professionals

[Advice from medical professionals]

They (doctors or nurses) also forbid me to do heavy work. To take rest and to try to take more food. Previously if I took meals three times per day, now they tell me 4-5 times. They recommended these things (1). They told me to take some rest (2). All says that, one cannot do the heavy works while she is pregnant. Doctors say, everyone says (4). They said because if I pulled heavy vessels then it could harm the position of my baby. It could get hurt or have breathing problem. They advised me to eat more frequently (5). They said because if I pulled heavy vessels then it could harm the position of my baby. It could get hurt or have breathing problem (5). They advised me whenever one is pregnant she can't take much medicines. I followed their advice. I was given tablets for gastric. I used to take 1 to 2 gastric tabs (5). I also knew that the size of my baby would be bigger and it would cause problem during my delivery. They used to advise me to eat less but I should eat frequently (5). They said that the Siarel doctors....."as you are poor, you won't be able to visit a private doctor. So, follow whatever they advise you." (5) Say, as from my previous experience and as advised by the village doctor, I would want it delivered in the hospital (6). Take vegetables. Aurum leaf and others, like sweet gourd. He says (indicating husband) and doctors also advise (6). Doctor brought from the hospital and showed and advised to take the tablet. I went to the hospital, they had advised this thing, because "you have low pressure" "you have to take more" advised the doctors (6). They tell all good things. For remaining healthy, to take a little rest, take right food. To go to hospital on feeling otherwise. Only if I feel bad. On feeling a little bad symptom, one has to go to the hospital. Advise for going to hospital immediately on setting in of pain, all these, and for reporting to hospital even before setting in of pain. (6). Advises to stay good, to take good food, more quantity (7). They said that in my pregnancy period you should take good food like egg, milk. You should have strength. Doctors said this. They also said to take much rest (9). Like this may used to say, means doctors used to tell also myself know, outsiders also used to say do not perform heavy work, forbade to perform heavy work that's it. Problem may occur due to performing heavy work, problem to baby will occur, used to tell problem to myself will occur. Used to tell to be at rest. Did not tell what type of problem, said just like that do not perform heavy work

(10). That it has Vitamin it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. Have. I do not remember. They said, doctors said those who prescribe they said. Don't remember. Take for that and we poor cannot arrange anything. If others deliver baby eat a lot of things, may be it helps develop brain of the child. That you think we cannot bring them clearly. Now this we have got free of charge, eat this (giggle) (11). They said additional food have to be eaten, have to eat more, have to eat good food, didn't say many thing? Doctors came and said came from Hospital and said woman came from Hospital and said. What you will eat your baby will get that. Eat Vitamin type food, eat more Vegetables, eat rice, drink milk, eat egg then baby will be Well. That not to engage in more work, heavy wrk not to undertake heavy work, tells many talks. (11). Didn't eat any other tablet at all. Restricted to eat any other thing. People from Hospital had restricted. Bought that a lot of medicine for leucorrhea when the baby was in womb for two months.....due to passing of a lot of leucorrhea fluid. Later consulted with Doctor from CRL and brought medicine and that the doctor who comes at home he told says.....I have said we have discussed that these medicine were brought later he said these again he later called that office and told that these cannot be eaten (11). They, they render good advice. Eat more, eat good things, sleep, sleep for two hours, take rest, they say this (11). That Ajmeri Apa used to say, then mother said, aunt said, everyone said, then people of homestead also said.....that do little heavy chores, or job requiring more (12). Told besides eating Pushthi have to eat other food like vegetables, fruits. To eat as much as I could no need to eat more than that, how much stomach can accommodate? They also to eat good food, good vegetable, egg, milk (13). Advise is given just on going to hospital. Have to eat properly, have to take rest timely. Like tells to eat a lot of thing. In pregnancy they tell to eat supplementary food. They tell to more than what ate before. Because then it is not one person's meal that is for two person that is why tell to eat supplementary. Tells not to lift heavy tells to take rest. If rest is taken may be own body remains tired say worked for six hours, after that may be mother feels weak, after that if rest is taken then com fort for mother comfort for baby, or else pressure may fall on baby (14). At Hospital the card that has been given to us in that it has been written "pregnant mothers should take food correctly, baby will be physically weak if food is not taken correctly. Food has to be taken correctly, fruit has to be eaten, has to eat good food." (15) Since Doctor Apa advised to eat more good food said whatever can eat t to it that whichever my taste feels to eat that, poor person whenever can bring anything eat. Doctors have advised for my betterment, we are illiterate people do not understand many thing again if made us understand then we understand. Are you not telling for my betterment as you are telling now (15). They make understand if go, what should I do, What will keep the body healthy. Slept in the day. Didn't do any heavy work. Didn't pick anything, half of the family work were done by mother in law or myself, not much of pitcher filled, many thing such meant. Took and ate food properly, if expecting mother eat properly then the baby will born healthy, baby will remain good, to eat properly (15). I used to go to the Nutrition Centre. There the sisters used to say that it would be good if I eat nutrition. It would keep both the mother and the baby healthy, I was influenced by her sayings (16). Then they used to say that I have to eat one more meal, I used to eat 3 times a day then I had to eat 4 meals a day. Because my baby was eating from me. They say that if you eat your baby would remain healthy. About working they used to say that I cannot take heavy load, but I can do light chores and at least have to rest for 2 hours a day (16). They say that they give. It is given since you do not have blood in your body or giving for weakness of body. Then you why don't eat? Must eat? The way they dictate behave like that. That they say good not bad. As-now doctor has come, said you come to hospital, baby born there, get delivered there. Now does anyone give wicked advice no everybody gives good advice (17). Will take all medicine there is no rule. Like if I go to doctor Apa by seeing say-at this time this medicine cannot be taken, or if have any other disease cannot take this medicine. Can take later. After delivery of baby can take (17). What they will say? They will say hospital, delivering baby, for regularly going. For doing monthly ultra sonogram. What they will say about eating, do they give any food? They say that eat this-drink milk-eat egg (17). Talked to a lady doctor. She had advised me to perform Ultra sonogram. But later didn't go also didn't perform. I used to complain to Apas they used to advise for drinking more water, actually they couldn't judge my problem. They gave advise.....ICDDR's senior executives wanted that not a single baby should die at ICDDR. So that no mother should become childless (19). Khadiza Apa came Wednesday. She told us to go for Ultrasonogram at Thursday (20). Khadiza Apa every time told that delivery should be arranged in Matlab or Khader Gaon. She suggested me that if I wanted a safe delivery I have to eat vegetables and Nan-Tan. I mean vegetables and small fishes and everything that is healthy food. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? She discouraged me to work a lot and any of a heavy work and many a time suggested me not to lift any heavy thing during the pregnancy period (20). Tells about works. After birth of baby till three months not to do heavy work, now is 9<sup>th</sup> month.....isn't time nearing. Now not to do work requiring force. not to carry pitcher (24). CRL's Apa came in every month. And doctor suggested to eat good food, milk, egg and not do any heavy work. Doctor knew the situation; he diagnosed and gave the medicine (25). The doctors said to eat good food, egg, milk, apple, orange and several type of good food (26). They said not to lift heavy things. I should take rest for one hour. I should not do the work where force is required. The heavy what jar. I should not do the work where I feel weak (26). She suggested not doing any heavy work. She suggested eating nutritious food. She suggested to eat more than before. As I was pregnant (27). They suggested eating milk, egg. They suggested taking huge sharbat (a sweet drink). They informed about my fetus, about the delivery and also the movement of my fetus (35). They tell to drink more water and more food, more good food. Fruits, banana, rice, fish (36). They take me to go to training. They give me information to go to training, and two of my sister in laws go to the training also (36). Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? She discouraged me to work a lot and any of a heavy work and many a time suggested me not to lift any heavy thing during the pregnancy period (36). If one maintains can be benefited out of those. All says that, one cannot do the heavy works while she is pregnant. Doctors say, everyone says (37). I am not allowed to take any powerful medicine during my pregnancy. Familyv doesn't allow me to. Say for example; I have been given tablets for fever and

allergic problem. But, I am not allowed to take those. I am not allowed to take and I also don't take any. I am afraid of taking to take. As doctors permitted I took medicines. As both (doctors and family members) have permitted, I could take medicines (37).

[Trust in medical professionals]

I personally keep my faith in ICDDR hospital, first I go to hospital in case of my any problem (14). Assume if husband stay outside even than everything goes according to him. What says, went to hospital, was afraid, baby is physically weak, baby cannot eat properly, so he said to do the way they say. However advantageous to them and good to them. How they tell you do that way, you listen to them (15). The baby may face harm. But the doctors surely may have considered about the harm of baby. They give it to keep the baby safe, but many don't understand this. They do. No doctor sends a patient to a scissor avoiding a normal delivery that easily. I asked a lot to do scissor delivery for that baby of mine, but they didn't do it. They said that you would have a normal delivery. Even in this time when I got to know that the baby's head is bid; I asked them if I need scissor...they can do it. But the doctor said no, you will have a normal delivery. That's how I came to know that the doctors do not send their patients for scissor-surgery so easily (16). I do believe in everything what they say. I have that belief. Sometimes they said, they gave us a card, there is written there, that if any pregnant mother eat less food it would be reason for the baby to die, pneumonia, it may bleeding in naval, and the mother may die. Do the doctors want harm to us? Is there anything to unbelief the doctors. Is there any benefit with throwing out this? I will eat then. Who those understand the doctor is right, they will not go to Kabiraj. They will go to Matlab hospital. (26). They are doctors. Whatever they say is for our good, they won't say anything which will harm us. Actually, I always support the doctor and nurses. I never listen to any other except them. So, now they will care me in prescribing me medicines. If I follow their prescription, then I won't have any problem. So, if I buy any problem without their consult then I may have problem; because, different medicine has different range of power. I always support the doctor and nurses. I never listen to any other except them. (37) For well-being. For my well-being and my child's well-being, I followed their words. If I listen to them, it will be good for me. (They know) how to do (or which is the way to handle). If I follow them, it will be good (38). They never intended to do harm to me. They gave it to me for my well-being (38). People around me said, "Follow the prescriptions given by the Siarel doctors. Now you are taking medicine. If they ask for routine check up the do it. if they ask for ultra sonogram, then do that." (39) They are doctors. Whatever they say is for our good, they won't say anything which will harm us (4). People around me said, "Follow the prescriptions given by the Siarel doctors. Now you are taking medicine. If they ask for routine check up the do it. if they ask for ultra sonogram, then do that." (5). Their saying is good for self, for remaining healthy, why to think ominous thinking, what are the benefits? There are no benefits in listening to people. If I want to listen for me hospital is there. They will check at the hospital (8). I went to ICDDR,B, I followed what the doctors said. I followed whatever was said (25). It may harm the baby. The baby can be abnormal. To get a safe delivery and healthy baby we should follow the doctor's suggestions (25).

[Conflicts between advice from family members and that of medical professionals]

When this baby of mine was born I wanted to go to Dhaka but my husband said that I shouldn't. My sister in law said that whatever she feel is good for her let her do that. But now I understand that for me my parents have gone through under a lot of pressure with my 2 kids. I thought I would go to Dhaka and see the lady Professor I always go to and listen to what she says. If she says the situation is bad I would stay back and if not then I would return. But my husband didn't agree, he said I didn't need to go there. Then I went to Chadpur and did an ultra sonogram; there he said that the baby is alright, so I didn't go anymore. I consulted with the doctor myself about the ultra sonogram and what will I do if the baby is not healthy (16). I just told that I want to go to Khader Gaon but my husband threaten me. If I asked him, he just threatened me (20). Who will do tension for me? Mother in law, sister in law, my husband said not go to hospital. Doctors said for the betterment of baby and for me. My husband said that my wife would stay at home. Doctors are not required. I tried to make him understand. But he does not have any sense? (26)

Will listen to husband's one, husband's one have to be listened to. At the time of delivery of my last baby everyone said to deliver at home my husband said will be at hospital, was born at hospital. If not if he does anything out of anger. Nothing can be done without permission of husband (14). Like, why you will go to hospital? "We will get your baby delivered in house. Hospital is not good", those are said by some of the families (7). I felt the labour pain at night. Then Khadiza Apa came and brought me to Matlab, but they wanted me to stay in house. My guardians, my husband (20). Our entire child born in our house. But my last child (daughter) had born in Khadergaon. House, I mean we will go to Khadergaon or Matlab. But my husband is root (GARA) enough. He did not agree. He seemed it'll be better in our own house, better in house. If everything was going on better during delivery then no one wanted to go to Matlab or Khadergaon. As the critical moment arisen, so, they permitted me to go hospital (20).

My mother and their generation used to work all day long unless the baby was born, used to pedal out the paddy. But in case of us pedaling is strictly prohibited, we are not even allowed to carry 2 KG water. The doctors forbid to do heavy works. But the older generation they say that they worked a lot and didn't have any problems. Now we get sick even if we don't do heavy work but our mothers they can still work as they used to in their times. We can do nothing comparing to them. We don't take heavy load but still we are weaker than them (16). (Mother-in-law) tells laughingly "what a time has come Bou do not work". Mother in laws they are of earlier time what they understand, what doctors tell that must be listened to (18). They (doctors) said because if I pulled heavy vessels then it could harm the position of my baby. It could get hurt or have breathing problem.. But, I had to work as my mother-in-law didn't let me to avoid these harmful things. She wanted me to work (39).

I did not take the medicine for gastric every time. They told that it could be created problem. My parents-in-law. They prohibited

me but I took medicine after three months. I have to save my life also. It did not mean anything about their opinion. I was less experienced during my first delivery. So, I did everything what they suggested. And during the second time- I took medicine. I ate medicine what the doctor's advice (27)

They (doctors) told me to take some rest. Some sort of lie down. Villagers don't know that much they told. I move/ behave by my wish, I lied down. I lied down as I wish. Say if I felt bad then I lie down. I did those which I prefer. They (neighbors) told these without any reason. Without any reason different people told different things. If I told....I know elders told these to follow their word. I told (means feel) it good (41). My husband and neighbors, I didn't believe, my husband forced. Brought him home and got me treated. He used to tell my husband your wife doesn't believe this why do you? Husband told what she understand? Doctor's one is easier and good. They didn't believe this. If babies were taken along with amulet then cut and keep. That's why I do not take him with talisman. Actually effect of which cures is not clear (19).

[I would follow doctor's advice regarding conflicting issues]

Like, why you will go to hospital? "We will get your baby delivered in house. Hospital is not good", those are said by some of the families. I lay more importance on doctor's advice. I do not listen to elders, listen to doctors. (7). One that of mother in law's advice is not good, as they say they also were pregnant----"we were also pregnant", didn't we work all, that's why they do not feel mother in law to be correct. They say from past experience. For this reason you feel that doctor's advice is better. By taking everything into account (7). I think it's best to follow the doctor's advice. Easy and good because the decisions that they give is good for both mother and child. Because no doctor would give bad advice to a mother for her and her baby, they are experienced and practical, they know about this. They know which keeps a mother and her baby both healthy. They are not like my mother and mother in law, who got the ideas from seeing it time to time about which is good or bad (16). Should obey, I am seeing her taking good care, there is no problem. Delivery is also being affected correctly.

Mother in laws they are of earlier time what they understand, what doctors tell that must be listened to (18). It did not mean anything about their opinion. I was less experienced during my first delivery. So, I did everything what they suggested. And during the second time- I took medicine. I ate medicine what the doctor's advice (27).

[Doctors give advice for good]

I thought that they gave me a good rule to maintain, and they give the proper rule, if I maintain those rules that would be good for my health. However I thought doctors tells the better. Doctors advice will follow. Doctors advise is good other than husband's and mother- in- law's (27). When a doctor suggests there is no problem (37). In this case, we must understand. Mother can understand what will be better for me and she also consults with nurses. Actually, then do tension about me. They ask me whether it is true or not. Isn't it necessary to ask about anyone? Then, we must ask the nurse. They know what will be good or bad. They are responsible for everything. (37). Following Doctor's saying is a little good, gives advices. Myself will remain healthy, myself will remain good, for that it is easy to follow (24). I lay more importance on doctor's advice. Why? They also say about position, good, we are also feeling good, there may be many problems with village midwives; if child is not delivered in 12 hours may die as well. Doctors say all good and elders keep saying what they say usually that is the difference (7). Doctor's one is easier and good (19). I think it's best to follow the doctor's advice. Easy and good because the decisions that they give is good for both mother and child. Because no doctor would give bad advice to a mother for her and her baby, they are experienced and practical, they know about this. They know which keeps a mother and her baby both healthy. They are not like my mother and mother in law, who got the ideas from seeing it time to time about which is good or bad (16). They tell me everything about my child's well-being. I already told you, ICDDR, B's apa says good thing (1). How this will understand doctors have said for good, words of doctors must be taken, have to go to doctors (8). They are doctors. Whatever they say is for our good, they won't say anything which will harm us (37). For well being. For my well-being and my child's well-being, I followed their words. If I listen to them, it will be good for me. (They know) how to do (or which is the way to handle). If I follow them, it will be good (1).

[Doctors know better than family members]

Doctors are relatively better. Do old villagers know everything? (meaning she thinks old villagers do not know everything). Doctors, apa (madam) know better. Family members know everything? This apa know everything. They know how to be well and how to maintain life. They know everything. You know...they know according to the type of food I consume, in which position child will be, and how to develop child's brain (1). Family members' recommendations are tough to follow. When the birth process started, doctors really take care of me. They know everything. Do my family people know all these? (38) Because no doctor would give bad advice to a mother for her and her baby, they are experienced and practical, they know about this. They know which keeps a mother and her baby both healthy (16). I do not listen to elders, listen to doctors. They know better, see better (7). Why, they also say about position, good, we are also feeling good, there may be many problems with village midwives; if child is not delivered in 12 hours may die as well (7) Doctor is involved in this and is experienced, neighbours are also experienced, but less (39). Doctors recommendations. They know everything by examination (medical examination). They have become doctors. Those ICDDR, B's doctors knows everything. They know through the exam how a mother can be well/fit. Villagers told by the "Hadis" (religious theory which came from Prophet Mohammad). They told some truth. Sometimes I followed them sometimes did not followed (41). Doctors are relatively better. Do old villagers know everything? (meaning she thinks old villagers do not know everything). Doctors, apa (madam) know better. ICDDR, B's apa. They tell me everything about my child's well-being. I already told you, ICDDR, B's apa says good thing. Family members know everything? This apa know everything. They know how to be well and how to maintain life. They know everything. You know...they (doctors) know according to the type of food I consume, in which position child will

be, and how to develop child's brain (38). Doctor knew the situation; he diagnosed and gave the medicine (25). They know everything by examination (medical examination). They have become doctors. Those ICDDR,B,s doctors knows everything. They know through the exam how a mother can be well/fit (2).

[Doctors' advice is easy to follow]

Doctor's one is easier and good (19). I think it's best to follow the doctor's advice. Easy and good because the decisions that they give is good for both mother and child (16). Following Doctor's saying is a little good, gives advices. Myself will remain healthy, myself will remain good, for that it is easy to follow (24).

[Education by medical professionals – delivery related issues and nutrition supplement use]

Then after attending a training class there they lecture on various aspects of child delivery, growth of child etc. Everything from child birth, Rexene, cotton, all these items I will arrange properly before the time. I will be required to take 4 pieces of cloth, that we collect beforehand. When we go to doctor we handover these items to him/her. On their receiving ----- (interviewee starts talking) (7). What they teach, so that the mother remain healthy and baby also remain healthy. Remain healthy that is to say bleeding takes place on birth of a baby, in the village they do hold something, say about delivering a baby without a midwife. Have to go to hospital. At hospital less blood passes. They have restricted to deliver at village house. All has been advised to go to hospital. So that if they go at hospital mother and baby remain healthy. They take care so that the remain healthy. Hospital is good. Remain healthy. They take care of everything (8). Just like that taught what should be during delivery of the baby. Did not say anything else. If the baby is delivered in the house just like that then what to do, means if it is delayed in going to hospital, what self will do taught these (10). Since Doctor Apa advised to eat more good food said whatever can eat to it that whichever my taste feels to eat that, poor person whenever can bring anything eat. Doctors have advised for my betterment, we are illiterate people do not understand many thing again if made us understand then we understand. Are you not telling for my betterment as you are telling now (15). They trained us at their home and tell to good take care of baby. They taught us so that every time two person go with me. They taught us like--I f I give birth in home then how to take care of baby, what is the procedure of delivery, if it is seen anything bad then need to go to hospital. They tell me that if it is seen anything bad then need to go to hospital. How delivery can be happened (36). I follow them who are give training. In a problematic situation I make a call to them. I gave my name to them and I made a card, three times took me and one more time will take me. For being good. They trained me what would be better. The oldest person did not get the suggestion. They now trained us (36) Bah! Advise for going to hospital immediately on setting in of pain, all these, and for reporting to hospital even before setting in of pain. For going to hospital, if I go to hospital, I remain healthy, fetus will remain healthy, get good treatment. That the mother even does not face little damage, let a baby born who will be healthy, or receive no damage, or remain all healthy and let the mother survive and also the baby (40). When they gave me pushti (nutrition) they told me that it will good for me. Child will be getting healthy. Child will be healthy. Health will be good. Child's. Child will be healthy (2). I ate them willingly. They said me to eat it. There will be a good result for you and your baby. Do not throw it away. They said it has been give for betterment. Eating pushti, will be beneficial. You eat it. Do not throw it away (9). They have thought requirement is there give for that, for that didn't tell anything. They felt necessity so came and gave that's it (10). Said that on eating Pushthi it will be good. Pushthi Apa (said). Will be good for baby, baby will be wholesome, will be healthy. Can understand if you say elaborately, everything is but good, even then have to tell elaborately (13). They said it is good to eat these medicine. Earlier also gave. We ate, these are good for health. They said that they are telling after eating themselves, that is good, after hearing from them I have eaten. On taking this blood is purified that is it (13). For Iron, the doctor madams came to our house and said that it reduces blood deficiency, so they say that Iron has no problem (16). I used to go to the Nutrition Centre. There the sisters used to say that it would be good if I eat nutrition. It would keep both the mother and the baby healthy, I was influenced by her sayings. I was inspired (16). This is because it reduces blood deficiency, so don't say anything. For Iron, the doctor madams came to our house and said that I reduces blood deficiency, so they say that Iron has no problem (16). I think beneficial-because in my this hand there was a tumor. This.....this place....later I showed to many doctor. Later due to baby in the womb I haven't taken medicine, after that due to taking of Iron tablet it fused absolutely, within a few days. That it became this big Apa. Sooner after taking Iron tablet it fused.....not there. I considered it beneficial, that's it. Anemic condition is removed with Iron tablet. Eat for this reason (19). Because used to understand that this was very important for mother and baby, better than other food, more Vitamin they considered beneficial. They got training that's why telling so (19). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave that tablets (25). Eating iron tablet.....Doctors say that if we eat iron tablet it increases blood. It helps to open (26). Not so much. Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (36) That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. They said, doctors said those who prescribe they said. Don't remember. Take for that and we poor cannot arrange anything. If others deliver baby eat a lot of things, may be it helps develop brain of the child. That you think we cannot bring them clearly. Now this we have got free of charge, eat this (giggle) (11).

[Positive attitude toward supplements because doctors gave them]

Mother in law view it positively. Tells eat. If they give what is your problem in eating? If it benefits you if Doctors give you take what is the problem? (15) As they said so it (iron tablet) must be good. I do not know for what reason they gave it, I will do anything as they said. If they say to die, I will die (26). They thought medicines were suggested by the doctors. They thought, if I took vitamin tablets I would remain healthy, that's why (37). If you got it but your community people told to not to take it, what would you have done? I would follow the doctor Apa's advice and regularly take it..They never intended to do harm to me. They

gave it to me for my well-being. I would take the medicine (vitamin pill) because doctors Apa gave it to me. They never intended to do harm to me. They gave it to me for my well-being (38). Medicine is given from hospital, medicine is given for betterment. I am taking on assumption on some body's saying and this has been given after detailed calculation involving what will be good for gestating mother, what will be bad for her (40). On words of Doctors (I have taken the tablet) (24). See that doctors are giving pushthi for betterment. I took it as doctor advised me to eat pushthi. He advised me to eat it and said that it would be better for my health. It's a mixed of grinded dal, rice and molasses. They (family members) thought it (iron tablet) would be better as because it was suggested by doctor for pregnant mother. Why they would react negative? (25). Iron one. Medicine is given from hospital, medicine is given for betterment. That I am taking on assumption on some body's saying and this has been given after detailed calculation involving what will be good for gestating mother, what will be bad for her (6). If I consumed it that..... It was good to consume. It was not harmful for child (means- it was good for child). This this (bla..bla..) Doctors told that so I consumed (2).

[Husband or family members asked to follow doctors' advice]

Assume if husband stay outside even than everything goes according to him. What says, went to hospital, was afraid, baby is physically weak, baby cannot eat properly, so he said to do the way they say. However advantageous to them and good to them. How they tell you do that way, you listen to them (15). They say to eat. The direction in which ICDDR's sub centre is located, tell me to go, go to doctors. They never ever restricted me from going. That on this 22nd will go, don't forbid to go. To me his father advices to go to hospital (her husband). My sister in law also tell to go to hospital with the onset of pain. Why you get more harm? During my first baby I have suffered harm (17). I mean they did but we had to put a little pressure to go there against their will. Now it's not like that. If there's something wrong; it's them who send us to the hospital. They don't prevent anymore. Now if a baby is delivered at home; it is observed that the mother gets Epilepsy. Gets torn in the lower, if it happens at hospital, they don't require the extra money. It is less expansive, both the mother and the baby remains healthy, gets free medicines from the hospital but if it is home then they have to buy the medicines from outside; that's why they say that hospital delivery is better than home (16). My husband told me to go to hospital (27). They advise me to go to the doctors at ICDDR.B. they advise me many other things. Neighbors, and other people whoever knows, advises me. They advise me to keep contact with the doctors. So that they can care me in a good way (37). They told that it will be better to take medicine from Hospital. My family members, my husband. My husband decided also I did by me (20).

[Not enough information was given regarding potential effects of nutrition supplements]

Nothing she (Pushthi apa) is to say. To take one packet in the morning. She is to say that the food value of the nutrition pack was equal to 1 or 2 eggs (6). They do not come. In pregnancy period they did not come. doctors did not give any advice yet (9). That means that I have eaten pushthi, whether weight of baby increased or reduced that they used to take weight after coming to my residence. (They) did not suggest any edict (10). They (Pushthi apa) did not suggest (what should do or should avoid during pregnancy) (35). Not so much. (Pushthi apa) Just told to get the food with full of vitamin. But we were poor enough to buy and that's why how could we get those? (36) It has to be eaten, this they told and go. They didn't tell anything else, tells to eat, they have given for benefit. To eat that's it (10). They just said that how could it be made and eaten, nothing more (25). They came and gave it to me. I ate. They did not tell anything (2). Do not understand advantage take because have to take, that's it (14).

### 3.4 Expected benefit and perceived benefit

[Expected benefit – general (good or healthy)]

It was for my well-being. Through this, I could do better and my child also would do better (1). Told its good take it. Everyone told this. When they gave me pushti (nutrition) they told me that it will good for me (2). When they gave me pushti (nutrition) they told me that it will good for me. Child will be getting healthy. Child will be healthy. Health will be good. (2). They thought medicines were suggested by the doctors. They thought, if I took vitamin tablets I would remain healthy, that's why (4). They say good about it and also it is a extra food. Advantage! What type of advantage it could be! For that, baby becomes healthy. Why did they give me! It would be better for me (5). They are giving medicine, I am taking them, sleeping for 1 to 2 hours, so that the fetus remain healthy. I am taking, so that my baby remains good, I also remain good. For betterment and the Iron one, has to be taken for all through. What I say, which may bring betterment. They will remain good, their children will remain good, they are giving, they do not give for any bodies bad, since beneficial they are giving I am also taking (7). They said, because that will be good for me and will keep me out of problem. Why I am taking? -----they are giving for betterment and I am taking that's all (7). They said it has been give for betterment. Eating pushthi, will be beneficial. You eat it. Do not throw it away (9). They considered beneficial. On eating this benefit will occur, if Pushthi is eaten will be good (10). Couldn't breathe. Felt very bad physically, physically remained good if eaten small quantity, that's it (12). So that the baby would born healthy. Said that baby born will be healthier if *Pushthi* is eaten. At the *Pushthi* center they said to eat *Pushthi*, baby will be healthy, my health will also remain good (12) Said that on eating Pushthi it will be good. Pushthi Apa. Will be good for baby, baby will be wholesome, will be healthy. Can understand if you say elaborately, everything is but good, even then have to tell elaborately (13). So that baby remain good remain healthy (14). I used to go to the Nutrition Centre. There the sisters used to say that it would be good if I eat



nutrition. It would keep both the mother and the baby healthy, I was influenced by her sayings. I was inspired (16). Because if I had 4 meals at home and nutrition with it, the nutrition would count as extra food. As a result it was good for both mother and child for the nutrition being an extra meal (16). What will happen? Will be good (17). Iron tablet is good for health (18). Will eat for this reason that Pushthi is also part of body. Like Iron tablet is beneficial for body, take multi Vitamin-this is also benefit (19). I only ate the Iron tablet. Everyone told that it is good for health in the pregnancy period (20). It was a nutritious food. It makes the body healthy. They thought it was a nutritious food. So, it would be better for my health. (27). They thought; medicines were suggested by the doctors. They thought, if I took vitamin tablets I would remain healthy, that's why (37).

[Expected benefit – Specific effects]

(Common)

(Provide energy to the body)

If mother gets nutrition then baby will be healthy, mother will also be healthy, get nutrition, get a little energy. This is what the feel. She is to say that the food value of the nutrition pack was equal to 1 or 2 eggs. Feel the baby will get nutrition, mother will get nutrition. The baby will remain healthy, or remain good, will have energy. It will give strength to my body. Will have energy, blood will form (6). It will produce blood, Calcium and energy. Will have energy, blood will form. Fetus will remain healthy, it will be healthy if the mother is healthy. Baby will be also healthy (6). They think that our daughter is sick she will come round if it is taken. Good that weak in physique, then anemia, otherwise also baby is in the womb. Before birth of the child. Earlier also thought that sick, weak, will have little energy after eating these (19).

(Provide strength to the body)

It will give strength to my body. Will have energy, blood will form (6). Physically get a little strength that's it. Produces blood. Produces in body. It is said that if it is taken it produces blood in the body, then strengthens that's it. Assume if *Pushthi* is eaten, thought that the baby will be healthy. Will be healthy. Will have strength. Husband also felt the same, that if eaten there will be blood in the body (12). Taking for weak physique gave from here. They tell think if this taken then physique will not be weak and will feel hungry (15). This they administered for weakness. Now after eating this body will have vitamin, health will remain good, gave for this purpose, for this (17). Strength---the *Pushthi* is nutrition. *Pushthi* is one kind of energy of body. So ate that for this reason (19). To take the Nutrition (*Pushti*), fetus will be healthy and strong, they also told these things (20). Vitamin. Mother doesn't become weak. Mother remains healthy (24). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave those tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my delivery will be safe and my fetus will be intelligent (25). She told that it is better for health. They served it at your house. It help you to be strong (36). They advised to eat. It is better to eat *Pushthi* and it helped baby to be strong. And that's why I ate it (36).

(Provide vitamin to the body) If pregnant women got more food, it's good for moms and their babies (means they thought the program good). I think if I got vitamin tablet, my health was good and my child also be good. Through taking vitamins, I will be good (or healthy) (1). They said it (iron tablet) will fill the need of Vitamin (6). It will cover the deficiency of vitamin. It is a kind of vitamin. You have to eat it. Daily you have to take it. My health will remain good. I will be strong. They said this (9). That it has Vitamin it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. (11). Shall I not eat? In which I have my benefit shall I not eat that? May be the *Pushthi* is given for my body's Vitamin replenishment also baby is being benefited. Advantage you think there is something like that has Vitamin in this. Would be after eating. It may occur to me, may affect my baby as well, will occur to me thought (11). Eating the *Pushthi* packet. Because besides Vitamin it has additional food (14). Which one *Apa* this medicine? This is beneficial. Is it administered any detriment it is for benefit. It is given for benefit. So that there is no deficiency of Vitamin, water has come to leg, so that Vitamin remains in body. There is edema there is weakness in the body less vitamin for that there is edema. What benefit, that there is edema in the body, that vitamin should remain in body, that there is no deficiency of vitamin. For this reason it has been administered (17). She told that this is a vitamin tablet and it increased my food consumption quality (20).

(Baby will not be malnourished)

Baby becomes healthy and weighted. Baby doesn't suffer from lack of nutrition (5). Take baby gains in weight. And should remain in good condition (7). It will meet the *Pushthi* requirement. On taking *Pushthi* the baby remain healthy. Remains nutritious. Again I also remain in good state, *Pushthi*. Baby remains good, becomes fulsome. This mother---(respondent starts talking). Becoming healthy. Why it is felt, so that some ones baby is not fulsome, was of malnourished type, that's why they gave for taking *Pushthi*. That's why take *Pushthi*. Baby will remain healthy. Wouldn't be malnourished (8). They can see that if the mother takes it, it makes both the mother and the baby healthy, so it is necessary. They had this impression that in earlier days they didn't take nor needed any kind of medicines to keep them or their babies healthy. They were healthy anyway. But now a day its clear that if we don't take vitamins we become sick and give birth to a sick baby. Only a sick mother gives birth to a sick baby. So their mentality has changed (16). At parental abode they used to tell that for eating that after eating *Pushthi* the baby will remain healthy. Baby will be big. If this was eaten baby used to grow quickly, mother's weight also increased. Good for baby and mother both (19).

(Child's brain would be better off)

If child got *Pushthi*, he could move properly. He could be healthy. They could get education as well. Their brain could be good (1). It has vitamins and it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. (11). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave those tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my

delivery will be safe and my fetus will be intelligent (25).

(Cure or protect diseases)

Viewed positively, because curing the sick, giving Pushthi packet to malnourished, why people will consider them in bad scrutiny (14). Which one *Apa* this medicine? This is beneficial. Is it administered any detriment it is for benefit. It is given for benefit. So that there is no deficiency of Vitamin, water has come to leg, so that Vitamin remains in body. There is edema there is weakness in the body less vitamin for that there is edema. What benefit, that there is edema in the body, that vitamin should remain in body, that there is no deficiency of vitamin. For this reason it has been administered (17). They said that it (tablet) is good for health. They said earlier as the doctors gave, it is good for health, it keeps blood clear, it protects many diseases (26).

(Pushthi)

(Provide nutrition to the body)

If child got Pushthi, he could move properly. He could be healthy. They could get education as well. Their brain could be good (1). Get pushthi (nutrition) (nutrition) (2). It's good to eat nutrition, it gives extra nutrition (5). It will meet the *Pushthi* requirement. On taking *Pushthi* the baby remain healthy. Remains nutritious (8). Baby will remain good, nutrition will occur to baby. Mother will also get nutrition, gave for this (10). They thought it was a nutritious food. So, it would be better for my health. They had a positive feelings (27).

(Child's movement will be influenced)

If child got Pushthi, he could move properly. He could be healthy. They could get education as well. Their brain could be good (1).

(Reduce hunger)

Taking for weak physique gave from here . They tell think if this taken then physique will not be weak and will feel hungry (15). Benefit will occur if eaten. Hunger will fed away. Will remain healthy (24).

(Micronutrient pills)

(Blood will be cleaned or produced)

I remember that. If I consume that it keep my blood clean(fresh). That's the thing. Blood will clean. That's why I took it. They told that. Tiredness. It removes physical tiredness. That's why I took it. one day she told me. I asked her "apa(sister), what does it happen if I take it?" she told that it clean(dirt free)his/her bloods whose health is weak (2). It will produce blood. Calcium and energy. Will have energy, blood will form. Fetus will remain healthy, it will be healthy if the mother is healthy. Baby will be also healthy (6). Blood remains clear if it is taken as said. That's it. What if taken this or not taken. So that blood remains perfect. Red. If not taken it is said that pregnant woman should take it. Why required to take they know it. (8) That it has Vitamin it will benefit the baby. That they are saying it will be good for baby's brain, again say it will produce blood if this is taken. (11). Physically get a little strength that's it. Produces blood. Produces in body. It is said that if it is taken it produces blood in the body, then strengthens that's it. Assume if *Pushthi* is eaten, thought that the baby will be healthy. Will be healthy. Will have strength. Husband also felt the same, that if eaten there will be blood in the body (12). Know that it will benefit. Says blood is purified. Baby will be good will be good for body. Said it will benefit if eaten, eating for that. We ate, these are good for health. They said that they are telling after eating themselves, that is good, after hearing from them I have eaten. On taking this blood is purified that is it (13). They told that Iron tablet was better and it supported to make blood for our body (20). She told that this is a vitamin tablet and it increased my food consumption quality. And also created blood for my body (20). Eating iron tablet...Doctors say that if we eat iron tablet it increases blood. It helps to open (26). They said that it is good for health. They said earlier as the doctors gave, it is good for health, it keeps blood clear, it protects many diseases (26). I knew that it was good for me and also for my fetus. It created blood (36).

(Provide iron to the body)

My body could get iron. Baby would be in healthy condition (5). About iron tablet? It was for meeting Iron deficiency or for energy (6). They gave it for nutrition and for good health. Iron increases iron in body (9). For Iron, the doctor madams came to our house and said that it reduces blood deficiency, so they say that Iron has no problem (16). They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave those tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my delivery will be safe and my fetus will be intelligent (25).

(Physical tiredness will be gone)

I remember that. If I consume that it keep my blood clean(fresh). That's the thing. Blood will clean. That's why I took it. They told that. Tiredness. It removes physical tiredness (2).

(Make the delivery easy)

They said that it gives strength and better for the fetus and for us also. So I ate them. This is why doctors gave those tablets. I wanted to be healthy and strong and that supported me at the time of delivery, I won't be anemic, my delivery will be safe and my fetus will be intelligent (25). Eating iron tablet..... Doctors say that if we eat iron tablet it increases blood. It helps to open (26).

(Improves appetite)

Think that it appeals for food a little. Physical weakness a little----(12) Taking for weak physique gave from here . They tell think if this taken then physique will not be weak and will feel hungry (15).

[I took the supplements in spite of side effects or dislike]

Nothing comes about to me. What could be happened? If I took it I troubled by constipation if did not take it was better. And then when took it I felt a bad smell. I did not feel problem /inconvenient or did not feel good (2). If I consumed then I faced it

(problem to pass stool). They told me that if I consumed it good thing will be happened. If I consumed it that..... It was good to consume. It was not harmful for child (means- it was good for child). This this (bla..bla..) Doctors told that so I consumed (2). There is an odor of sort have, gulp it down with water do not feel much of.....Know that it will benefit. Says blood is purified. Baby will be good will be good for body. Said it will benefit if eaten, eating for that (13). This odor didn't feel good to me. Said that on eating Pushthi it will be good. Pushthi Apa. Will be good for baby, baby will be wholesome, will be healthy. Can understand if you say elaborately, everything is but good, even then have to tell elaborately (13). That it didn't feel good to me in eating.. Consider the well being of baby, considering own health ate. Husband is angry. I had to eat what he wanted. For being healthy. And involvement of my husband is more. No problem is occurring to me. My husband wished more that's why I used to eat Pushthi. He used to think that after eating I will remain healthy, it was his desire how to keep me healthy(14). Despite being difficult to eat. (I ate because) Good if eaten. Took, cannot tell anything about smell or so. Took since Apa told obeyed to saying of Apa (15). Smells a little. Reason is there will be good if eaten. Baby will be healthy. Apas make understand many thing (15). I didn't like to eat it. I ate because I had to. To keep the baby healthy. I ate against my will. I forced myself to eat, had to fight with my mind to eat it just to keep my baby healthy. (Laughter) (16) That one was more troublesome. I had to go to the nutrition centre, after finishing my household chores I had to go there and then eat it. So it seemed bothering. Even after that I went for the sake of the health of mother and child. The nutrition was good (16). No Pushthi felt more awkward Apa. In preparing the Pushthi and in taking many times didn't feel good. Ate so that in body-----considering this ate that in Pushthi there is energy, ate. At times could not take. When felt good could eat (19). Smells a little, Reason is there will be good if eaten. Baby will be healthy (*shustho*). Apas make understand many things. (22). This one I felt disturb to eat. It was better for me, so I ate it (36).

[Perceived benefit]

(The baby was born large enough to be healthy)

Definitely, I felt good so I ate it. Through these, my child and me would be good so I felt good. It had impact. Child also got Pushthi (1). What could be happened? My baby was born and it was beautiful. Baby becomes healthy and weighted. Baby doesn't suffer from lack of nutrition (5). I have taken nutritious food during the 2<sup>nd</sup> and 3<sup>rd</sup> issues. The child was large in size. Only God knows. Was that for nutritious food or not ---. Beneficial, beneficial, both the ones. None had disadvantage. I am thinking, due to nutrition intake size of the baby increased. (6) There was no benefit to my baby. It was healthy a little. After delivery, it was 2 kg and 400 gram There was some benefit. (With laughing) As baby will remain health so they fed pushthi. Baby will be strong so they fed pushthi. My baby was delivered healthy (9). My baby didn't have any problem. By the grace of Allah was born wholesome as regards to nutrition, didn't born mal nutrition, may be baby born is less strong, despite many diseases around but he is good in this aspect. Didn't born mal nutritious. Waps 3 or 3.5 Kg (11). It benefited. Baby born was healthy. Was fatty of sort. This was also *mash Allah* fatty at birth (12). Result is there. Baby's weight was 2 Kg 700 gm that's it. Cannot tell whether benefit or detriment has happened, ate this much can tell. This I think that Baby was healthy (13). Baby born was healthy, was bouncy. Of course for the effect of Pushthi because I could not eat anything then in precise way (14) It's proved that because I had taken the nutrition my elder, 2<sup>nd</sup> and younger daughter were born weighting up to 4 to 4 and a half KGs. And by the grace of Almighty Allah those babies didn't get that much sick after they were born. After taking Pushthi and then again when I was in Dhaka I ate a lot of fruits. The baby became fat and healthy, that baby didn't get sick so often. Just cold and mild fever, that's all. Nutrition had its effects and then again I ate a lot of fruits like mango, jack fruit etc. maybe that's why the baby was big and healthy (16). Because that daughter of mine...she still stays healthier than the other kids. Mine and my sister in law's babies are of the age, one month gap. Her baby doesn't want to eat anything; skinny...on the other hand my baby eats properly and is different from the others (16). When gave ate or malnutrition was less seen, then body had nutrition, baby born were nourished. Baby was alright. Baby was good. Baby is healthy (17). Nothing happened, benefit happened. Baby was good. If Pushthi was not eaten then probably baby born would have been weak, or there is no vitamin, nothing happened. There would have been a lot of problem. I ate Pushthi, benefited the baby (17). May have an effect, first baby was quite large and weight was 3.5 Kg. Pushthi's effect is there, Pushthi is Pushthi for this reason baby born was large (18). Baby was large, wholesome that's it (24). I ate it at my first pregnancy period and got some benefits and that's why I tried to eat also at the last pregnancy time. My child was healthy after delivery (27). I did not get any loss. I did not find any lose, so I continued it. My child was being strong. Those who got it, is much stronger than the others (36).

(I feel better)

Definitely, I felt good so I ate it. Through these, my child and me would be good so I felt good. It had impact. Child also got Pushthi (1). Feel since taking Vitamin the body is a little better..Think pains of the body has gone away a little. Energy feels in the body feels good (15). But in case of that daughter of mine I ate nutrition and didn't feel bad. I felt like I could eat more even after I took a meal (16). I think beneficial-because in my this hand there was a tumor. This.....this place....later I showed to many doctor. Later due to baby in the womb I haven't taken medicine, after that due to taking of Iron tablet it fused absolutely, within a few days. That it became this big Apa. Sooner after taking Iron tablet it fused.....not there. I considered it beneficial, that's it. Anemic condition is removed with Iron tablet. Eat for this reason (19). The Vitamin one means after taking this my vertigo disappeared (19).

(No effect was experienced - Baby was small or weak)

What was the reason behind this?(not clear). I took it but felt bad smell, I faced constipation problem. With those things I also consumed but I did not get any advantage to consume it. I did not see anything. I did not understand anything (no impact).They told me that it gave good health. it will do this, do that ....but my child was not healthy (Time of birth). I did not see anything.

My children were very small.(time of birth) I took it but felt bad smell, I faced constipation problem. With those things I also consumed but I did not get any advantage to consume it. I did not see anything. Nothing comes about to me (2). Feel good, that it will be good on taking *Pushthi*. Nothing happened. *Pushthi*---elder son was 2Kg 200gms *Pushthi*. That after birth they weighed at hospital. What benefit it had? (8). Taking this (iron tablet) what happens do not know (8).

How I will say? Was it due to eating of *pushthi*? Was not different, that was even more sick, was born in eight months, was sick, means the baby was born one months before the date, I had typhoid fever took medicine. Problem didn't occur. Now whether it was good or not! I think it was good. Say the baby born n eight months for that it was malnourished for that couldn't understand, but no problem occurred (10). Benefit of baby, didn't see much of baby's, after birth this is not , baby had weak physique, was in hospital for many days. After that it came in mind the baby was not fulsome, baby born was weak, where went the *Pushthi*? (15) I did not get any benefit- My first child is very weak. My first child became healthier. He was 3 and half kgs in weight. But he felt a bad scolding in his hand and leg. He faced Jaundice, Pneumonia. Except of this he did not get breath after delivery. After ten minutes of delivery he started his breathing. Did not get trouble. But did not get any benefit also. You know that for eating *pushthi* baby becomes healthier, after delivery my baby got into those trouble. Got some benefit, but after delivery my child faced so many problems (25).

### 3.5 The will of pregnant women

(Follow cultural norms w/o understanding)

This I also do not understand. Just like that what they are saying I am just abiding by (7). My husband and neighbors, I didn't believe, my husband forced. Brought him home and got me treated. He used to tell my husband your wife doesn't believe this why do you? Husband told what she understands? (19) One practice if belly is empty then baby will be large, and if belly is filled then the baby will be small. Whether it happens is not didn't understand. Normally I eat less, cannot eat more (13). Would not let me go. In this condition do not go any place, anything ill-omened will happen. Or isn't there didn't allow to go to a particular house, didn't allow to do anything. It is seen that at noon time if you go in the sunlight physically felt bad or feel weak or if on walking or if walk or more of that or talking or -----will feel bad that's all. What happens in this? Take I go out. This cannot tell, *Afa*. This is known to elderly. What happens, say it troubles. What do I know, they all know it (17). They told that heavy work (during pregnancy) can be bad for me. Those senior and eldest persons (who suggested me); they can only know that why that would be bad or what type of (20). I maintained such as- should not go outside at 12 noon and at the time of Magrib Namaj. I didn't know the problem actually. My eldest persons suggested so (25). Do I know that (bad effect by *Alga*)? Usually my surrounding people understand that. They told that this type of thing could happen. If you become ill, they understand... If I become ill, I understand. Say, I have fever, I caught cold, I have headache. I can understand. But I didn't understand that (meaning she does not understand what *Alga* does but she understands when she becomes physically ill) (41).

(I do not believe the cultural norm but sometimes I have to follow)

I maintained by this way , it is told that at that time bad wind (*alga batash*). Bad wind (*alga*) can touch me. Many kind of problem can be occurred from the *Alga* , but in real sense. I do not believe that. I did not take any kind of *Tabiz* (traditional way to secure body from any kind of bad wind which they believe. They bend this *tabiz* on their hand) or like that. But I maintained (27). My sister in laws father gave this amulet, he is an Ayurvedic physician. He gave this to keep away all the demonic energy (laughter). I didn't believe in this amulets before. Now I have to otherwise they scold a lot. I don't believe in this anyways. If I don't use it they would scold. That's why I have to. If I don't wear it they scold saying that I don't listen to the elders (16). Jennies were created before human beings were created in this world. So they have unusual interest in human beings. There are no such things called Jennies or demons but now they say that there is. I don't (believe). But I have to follow this (16). I don't ever follow this. But sometimes I have to do as they say. Sometimes when I intend to go out around 12 or 1 o'clock, they don't allow me to go. What can I do, I have to listen to them anyway. I wait a while and pass that time and go after that. I have to (16). Follow my husband follows that's why has to follow. Any fish brought in the evening do not allow me to go near. Again after dusk do not allow to go anywhere. There is fear of Witches if I get afraid or if any problem occur to me, off course usually there remains no job after dusk. What detriment will occur, I do not know. I do not believe anything such (14).

(I needed to follow my husband although I did not want to)

Will listen to husband's one, husband's one have to be listened to. At the time of delivery of my last baby everyone said to deliver at home my husband said will be at hospital, was born at hospital. Will listen to husband's one. If not if he does anything out of anger. Nothing can be done without permission of husband (14). My husband and neighbors, I didn't believe, my husband forced. Brought him home and got me treated. He used to tell my husband your wife doesn't believe this why do you? Husband told what she understand? Doctor's one is easier and good. They didn't believe this. If baby's were taken along with amulet then cut and keep. That's why I do not take him with talisman (19). When this baby of mine was born I wanted to go to Dhaka but my husband said that I shouldn't. My sister in law said that whatever she feel is good for her let her do that. But now I understand that for me my parents have gone through under a lot of pressure with my 2 kids. I thought I would go to Dhaka and see the lady

Professor I always go to and listen to what she says. If she says the situation is bad I would stay back and if not then I would return. But my husband didn't agree, he said I didn't need to go there. Then I went to Chadpur and did an ultra sonogram; there he said that the baby is alright, so I didn't go anymore (16). My husband said not go to hospital. He knows well. They (mother-in-law and sister-in-law) said to go to hospital. Doctors said for the betterment of baby and for me. My husband said, my wife will stay at home. (He thought) Doctors are not required. I tried to make him understand. But he does not have any sense? (26)

(I only ate whatever available at home)

There was no time. The day those were available ate. No time. Not regular always. Fish, vegetable, occasionally brought meat (10) I when whatever then could, could arrange, could eat. Couldn't arrange didn't eat. When got ate then (11). I ate fruit, like grape, apple, orange, ate if brought. Did not eat Pineapple when this was in womb. Didn't bring and didn't eat Pineapple. If brought would certainly have eaten (12). All ways think Apple and the like, Banana and the like is eaten, when his father come from Dhaka bring along. Comes with 1 month interval. Brings just like that brought earlier now brings. (13). Food was normal. I used to eat whatever was cooked. They never brought anything which I shouldn't be eating...like the fish I told you. They wouldn't bring it at all. Whatever they brings in and cooked, I eat that's. no problem at all. It was normal (16). Say, he brought biscuit, and I eat. Sometimes I eat a little quantity of biscuit or sometimes I eat a little amount of rice and sometimes I keep the rest of food whatever I cannot take (26). I have told you that if those were brought to home then I ate otherwise not. I haven't taken any nutrition. May be I have eaten 1 or 2 mango during the mango season or if he (husband) had brought apple or anything was shared then I could eat (39). I have taken when I have got them, did not take if, I did not get them (6).

(Passive attitude toward supplement taking and general expectations about the supplements' benefit)

Since given take it (40). If they made any mischief I did not take. They (family) also told me "take". They told me "they have given you pushti (nutrition) . Eat it." so all people comments were same. so what could I do(means - that's why I took it). Sometimes I did not take (the supplement). As I wish (2). I took because I need to show the packet to them. Needed to show container (bottle) (2). They asked me to take tablets (5). They have thought requirement is there give for that, for that didn't tell anything. They felt necessity so came and gave that's it (10). The service provider suggested and so we ate (27). They just give, they say pregnant woman to take. Take there I hear from people that it is good if taken as said, blood remain clear, that's it. Taking this what happens do not know. This they understand that's it, give this, so take (8). Took for that---for benefit, it is beneficial to take Calcium, took for this. What I will say (about the benefits)? Why I used to it, I do not know (10) Do not understand advantage take because have to take, that's it (14). Cannot take for a few days could not eat. Now again take. (Because of) Odor. Why I am taking? They are telling if not taken properly then will be required to run to hospital. Think if not taken they reprimand (15).

(General expectation about the supplements)

Told its good take it. Everyone told this. When they gave me pushti (nutrition) they told me that it will good for me (2). When they gave me pushti (nutrition) they told me that it will good for me. Child will be getting healthy. Child will be healthy. Health will be good. (2). They considered beneficial. On eating this benefit will occur, if Pushti is eaten will be good (10). They say good about it and also it is a extra food. Advantage! What type of advantage it could be! For that, baby becomes healthy. Why did they give me! It would be better for me (5). It was a nutritious food. It makes the body healthy. They thought it was a nutritious food. So, it would be better for my health (27). If mother gets nutrition then baby will be healthy, mother will also be healthy, get nutrition, get a little energy. This is what the feel (6).

(I followed my own wish – I make decision by myself)

Sometimes I followed them sometimes I did not follow. I did as my wish which I felt good. I move/ behave by my wish, I lied down. I lied down as I wish. Say if I felt bad then I lie down. I did those which I prefer. I lied down by my own choice. Villagers told by the "Hadis" (religious theory which came from Prophet Mohammad). They told some truth. Sometimes I followed them sometimes did not followed. I did as my wish which I felt good (2). I took what (food) I wish. Most of the time I overlook others suggestions. I do what I think (own wish). I will do which I feel good (2). Sometimes they advise me anything on a sudden. But, all the time I can't follow. I understand what I feel better for me (4). They told same thing. But you know villagers. If they knew they tell something, if they did not know they also tell something. If they knew the rules they tell it, if they did not know they also tell it. But I only followed those things which I felt better (41). They say if you eat fish those rashes would become worse and won't go easily. But I ate fish and my baby is fine by the way. I don't follow this anymore but I used to. (Laughter). I don't follow it now because I don't follow any restrictions about food anymore. I eat everything (16). I used to take my own decisions. My husband also helped me (16). Chili, taking chili would harm the fetus. They (family members) used to say, I never cared. Do not care them. Chili? Chili, as per my desire (6). What he can say, I take my decision (8). What they will tell everything is to my wish. My one myself. My decision I take myself (13). My decision I have to take myself (18). They prohibited me but I took medicine after three months. I have to save my life also. It did not mean anything about their opinion. I was less experienced during my first delivery. So, I did everything what they suggested. And during the second time- I took medicine. I ate medicine what the doctor's advice (27). I tried to take that I got (food). It is my own decision (36). From my experiences I always tried to live my life (39). For him for me if the work is good then I do that (11). Now will go the way it is favorable to me. I will go the way that is safe for me (17). Do it (following cultural norms) from myself (24). If eaten more myself remain healthy also baby remain healthy and if eaten less myself become weak baby also gets weak, that's it. This you think earlier era people used to tell

now we do not believe this (11).

(A few women did not follow Alga related cultural proscriptions)

Sometimes, people are going outside at noon or at night. I cannot follow. But this is forbidden (38). Those days (Tuesdays and Thursdays) are bad I heard. I did go out, I didn't follow those. Nobody does. But the elders suggest but we don't follow. We go out if we have to...can't follow all the rules can we? (16). These (Khen) never followed. Never ever followed. When in laws were alive said. Now I do my job myself, now I do not have that. Normally many a times used to tell do not go out in the evening, do not go in the Noon, problem is there, wind will touch (10).

(I continued or stopped taking supplements based on my decision)

Stopped on my own. On taking I found that it does not taste good. It used to smell a sort. Stopped taking. There is no other reason (7). On my desire like when my desire came, when did not feel well did not go at that time. These were on my wish (8). They (family members) did not say anything. I ate as I wished (9). I myself considering eating this is good. On my own wish. My one myself. My decision I take myself (13). They said that if I eat it the baby would grow bigger, I ate it in spite of that. They said for first few days, but stopped after that when they realized that I won't listen to them anyway (16). Eat on my wish. If he (husband) didn't allow, even than would have eaten (24). They used to ask me to take medicine. But, I took medicine (vitamin tablet) on my own regularly (37). What will say, I take my one what they will say (15). Most of the time, I took my own medicine. If I forgot, they told me to go and take the medicine. If they were not supportive, still I would take the medicine (1).

(I would follow my own choice – under a hypothetical situation)

If I want to follow tens which one I choose. so I will do which I feel good (2). One should abide by one which is good. There is a calculation. Everybody has her own calculation. One is there said by the doctor may be good, one is there said by another person may also be good. One that comes to own understanding, Follow that one. From own experience which feels good that one to be followed (6). What can do this she thinks, which will effect which one, what will influence what? Does whatever is good (8). Then they did not help didn't tell anything else. About my affair, gave this for my advantage. my wish was final that's it (10). She will do that which one is according to her own understanding is good and correct. Anyone may tell me anything but I know which one is good for me. So which one will appear good for me that's right. Someone tells me to go this side then why I will go, no. (13). My mother in law says go about the way it feels good to you, no problem. What will say, I take my one what they will say (15). She has to decide with her own judgment from all of those advises and do what is good for her. That's it...She will use it and do what is good for her (16). She will do what is required to survive, that she will follow (17). Doesn't have an opinion of self, she should do what her conscious guides that will be all right (18). She will think about actually which one will be good to follow. Will think with her own brain actually listening whom will be beneficial. Workout intelligently. According to own intelligent (19). She should be done what she can decide (20). I would think by myself and I will follow which I preferred (25). She should do only what she wants. She only can use her intelligence. She can choose the better (36). It depends on the type of the advice. Who gives which suggestions (or advice) and try to understand her own thing also which one is good for her, her own or anyone else's? She has to follow her own intelligence (38). If it is ten different way will listen to none, whichever is in line with my understanding I will listen to that (11).

### **3.6 Other facilitators and barriers for nutrition supplement use**

#### ***3.6.1 Morning sickness (or vomiting)***

[Less food consumed due to vomiting]

But today I do not feel good. I vomited a few times today. Just lying down after taking my tablet.... Because of vomiting, I am not able to take foods (1). Felt good. In the beginning I could not eat, used to smell, then again used to eat. When baby came in the womb in the beginning everything felt smelly, could not eat. I used to vomit, in the beginning then first two months-one month then again it was all right. Later no more smell vomit used to come(10). When I have conceived, in the initial stage I couldn't eat and I just only vomited. Now , I can eat little (4). Think vomiting didn't occur profusely, only apprehended vomiting is about to occur, cannot see anything, cannot see curry, cannot see fish..... Then after it reduced after 4 months and can eat a little, odor also reduced (11). At the start first two months cannot eat anything, vomiting was there (12). My first, I was during first time when baby came in the womb at that time could not eat anything. Cannot even drink water.... Used to vomit and could not rise from bed. This during both the child, that cannot rise from bed, on water, on saline, gave eight saline, and kept me on saline (14). At that time could not eat for three months. One time in whole day could not eat. After baby came in the womb the vomit came (15). My sisters in laws had major vomiting problem as well as the abdomen pain. They couldn't even move properly, eat anything (16). I couldn't eat much during the first 3 months. From the time I could eat, I ate. I didn't feel good to eat, I felt vomit (19). Three months I didn't even take water. I meant did not take it over than to vomit everything. Then after five months it became (20) I felt vomiting at time of my other children..... (difficult to understand) I suffered much

during my third delivery. I vomited during the all time of my 10 months pregnancy period. I did not even eat anything. But these true Allah blesses me (26). I did not eat naturally at the first three months of the pregnancy period. I felt vomiting. After then this problem was over and I ate everything naturally (27). I felt vomiting and weak. Then I diagnosed my urine and knew that I am pregnant....I did not get any food till the four months of my pregnancy (35). I eat 2 times a day sometimes 3 times a day. When I have conceived, in the initial stage I couldn't eat and I just only vomited. Now , I can eat little (37). I was not able to take that much food on that time (during pregnancy). I felt vomiting (2).

[Vomiting is caused or exacerbated]

Previously I took it (vitamin tablet) for my child during previous pregnancy. I took it during my previous pregnancy. I cannot take because of my vomiting tendency (38). I was prescribed to take iron tablets but I couldn't eat. If I had taken I vomited. This time my I had a severe vomiting problem. I was in better health condition that time. That's why I took (during the previous pregnancy). Tabs are same. Actually, my health condition..... I felt vomit and bad smell, that's why I didn't take. (39). Like if I want to take the pill in hungry time I felt vomiting, felt bad smell. But if I took in full stomach I did not feel bad smell and did not feel vomiting also (2). During time if felt better the day felt better ate (the iron tablet), the day I vomited didn't eat. Took occasionally didn't take now and then that's it. I used to vomit used feel a kind of smell at that time. The it felt good then again I took.... Many cannot take many thing when baby comes in the womb. I used to vomit no sooner I had taken tablet, felt smelly (10). But some of them had difficulty having the Iron tablet. They felt queasiness to eat it (16).

### ***3.6.2 Acceptability of the supplements***

[Bad smell]

They gave me pushti (nutrition) and iron tablet at the same time. But I did not like it (iron tablet). Sometimes I took some times I did not take. but I had only harm(means - problem) that was my constipation. I felt a bad smell. That's why I did not take more (2). I took iron tablets. Sometimes I felt bad. But, still I took those tablets. I felt good and I also understood that they gave for good. But , this is me who couldn't tolerate. It (MM pill) smelt bad (5). I was prescribed to take iron tablets but I couldn't eat. If I had taken I vomited. I said them that I felt vomit when I took. Then they said as I couldn't feel comfort, so there was nothing to do. I felt vomit as I smelt bad (5). Did not feel good at that time did not take. Do not feel good did not take (the tablet). Smell is intolerable (8). The Iron one smells a little. Pushti is good, think on eating the Iron one smells (15). Cannot take for a few days could not eat. Now again take. (Because of) Odor. Why I am taking? They are telling if not taken properly then will be required to run to hospital. Think if not taken they reprimand (15). I didn't like the taste. It (MM pill) was stinky (16). Stopped on my own. On taking I found that it (micronutrient pills) does not taste good. It used to smell a sort (7). Some may not take *Pushthi* pack someone may take. Say of odor. Cannot tolerate (8). People treated it as a bad smell and told that they mixed Soyabin oil with it. I did not eat it at maximum day. Something smelt. Took sometimes. Took it irregularly. But did not mix with the Soyabin oil. I did not even take the blended pulses, only took the blended rice and something sweet one and mixed them then eat. I took it but did not eat. The raw oil smelt badly. Did it possible to eat Soyabin oil as raw? They (family members) always suggested eating it, but I did not for the bad smell (20). Didn't feel very good to me. Didn't feel very agreeable to me. Was smelly the smell of oil used to tinge my nostrils (14).

[Poor acceptability of the food supplements]

Taste like that of powder of roasted rice and lentil. Not that much. Not tasty (8). If it mixed with blended rice, sugar, sweet, then it turned into something like, what we say. To eat it-something like "Li Li" Something entered into mouth, something odd, then seemed it bad like slippery. *Pushthi* was not tasty that's why I refused (20).

[Good acceptability]

Good.....eat well to taste. Say feel good to taste (2). Has smell. It was good . I felt some bad smell and I also felt pain to passing of stool (2). I like that because I have seen those to be fried and packed. It tasted good (5). Felt good. Means color was good. Felt delicious. There was no odor (6). There was deep smell. Very good smell. It was good to me. They gave the rice powder, lentil powder and the smell. So they were very fond of me. When it is mixed with oil, I liked it very much. There was a little smell. It was good. It was good to taste (9). Felt good. Color was also good (10). It (*Pushthi*) was delicious. It was sweet doesn't it have sweetener (Molasses) in it, oil sweetener, lentil, rice. Felt sweet. That smell felt like those of Lentil, rice that's it. Didn't feel bad it felt good (11). Felt good. Talking of taste. Not hot, sweet. Liked it. Think there is a smell because when we crush rice, crushed lentil and after that molasses, smell is there. Good smell. The smell is very good (12). Felt good. Color of Ghee. Doesn't smell (MM pill) (12). Felt good, roasted rice, roasted lentil but with Soybean oil it had odor (13). For smell to me the earlier was good. Smell of that (MM pill) was little good (13). Felt delicious (15). It (*Pushthi*) was good to taste. It used to make you feel full even if you eat little. It smelled like rice powder. Not awful, it was good (16). Felt good but sometimes didn't feel like (18). It felt good to me in eating. Tasted good to me (19). It was tasty to eat. I found it tasty to mix it with sugar and banana. It was tasty enough. It was a good smell. The scent of dal was good enough. I liked it (25). It (*Pushthi*) was tasty (27). I mixed it with sugar, oil and water and took it. Why it taste sour. It was really tasty. Smell like soyabin oil. I felt the smell as because I mixed it with oil. I like to eat it with oil (36). I liked it. It was good. Appearance was also good. Sometimes it tasted good and on that time I consumed

the full packet. I already told that. But when I did not feel good. I shared with others (38).

[Make own supplement]

Sometimes previously I bought it. I made it by myself. Sometimes I fried the rice and grinded it and mixed with grinded with “dal”’s powder. And sometimes mixed with bananas. Those things I added to it. Obviously, I prefer the hand-made because I can add extra things as I wish. I can make it as my wish or as I prefer. I can add everything. It seems to be difficult but I can manage it easily. Then I took it for my well-being. I felt good so I consumed it. It will be helpful for my health. Sometimes I feel like to take those things. I can make it as my wish or as I prefer. I can add everything. I felt good to take my own because I can add anything as my wish. This is the good thing (meaning mine is good) (1). Actually, last 15 days back...no ..7/8 days back I have made the food item at my home which was the mixture of rice, dal and sugar. I like that food very much (4). Roasted some rice, after roasting mashed them then with sugar or molasses I have taken. Earlier as well in pregnancy I have taken. Like that and also available in book, then saw them in TV program. Again village doctors also say the same. When I took, before the onset of pregnancy. Why I took, just like it tastes good (7). I made by myself (27).

[Reasons why Pushthi was better than MM pill]

This was with oil, sugar mixed and ate so felt good, with oil, sugar and molasses ate in a dry powder form. Was good and tasty in eating (10). In eating *Pushthi* the benefit is that the baby born is Wholesome, has adequate *Pushthi*. If can eat the baby born is more healthy (12). On eating *Pushthi* the stomach fills up that’s why (13). *Pushti* is good, think on eating the Iron one smells. Longed for eating. Smells a little (15). Eating when hungry that’s it (24). As because it was mixed with so many things, like dal, oil, molasses, rice (25). I thought both of two were needed. But, I liked *Pushthi* most. I thought it would be better for me to eat it with the direction of doctor. It was a new food for me and I also liked it (27). There was taste/crave/desire in the mouth/tongue. Say, Iron tablet was just swallowed with water. Nutrition touched the mouth interior, felt little tasty (39). I liked the smell of *pushti* (nutrition) so I consumed (41). At the time of taking *pushti*, there was a good smell. For that reason I liked the *pushti* most (9). That was as like as our powder of the dal of *mushuri* (one type of seeds/ pigeon pea), then the rice powder which rice we take as meal. We saw how they made the *pushti* (nutrition). that’s why I preferred (2). I like that because I have seen those to be fried and packed (5).

[*Pushthi* was cumbersome]

Taking tablet is more easy, *Pushthi* is a little cumbersome, has to open, then it has to be mixed then eat. And the tablet is swallowed with water it is over (13). Assume Iron is good, think less cumbersome, opened and taken and that one has to go and eat going on foot is troublesome (15). The medicines didn’t take much time to take and it can be taken at home, didn’t need to go anywhere...so I liked the medicines most. It didn’t take time to have it and wasn’t fussy to eat. That one was more troublesome. I had to go to the nutrition centre, after finishing my household chores I had to go there and then eat it. So it seemed bothering (16). No *Pushthi* felt more awkward. In preparing the *Pushthi* and in taking many times didn’t feel good (19). Iron tablet was more easy to eat just using water and to eat *Pushthi* was a big process using bowl, sugar, water (25). I felt disturb to eat *Pushthi*. I have to collect it and then prepared and then eat. But after then I found it tasty (36).

[Reasons why MM pill was better than *Pushthi*]

Think this felt a little good in eating. Color of that is red, tablet is sweet (12). There was no smell of sorts (14). It didn’t take time to have it and wasn’t fussy to eat. That one was more troublesome (16). Vitamin is easy to eat, quickly finishes (17). The Vitamin one means after taking this my vertigo disappeared (19). Everyone told that it is good for health in the pregnancy period. But *Pushthi* was not tasty that’s why I refused (20). That is for the sake of feeding and tablet was swallowed with water. Did not feel bad but felt less bad. It is easy to take the tablet; it felt good just like that (40).

### 3.6.3 Other barriers

[Other barriers]

(Distance to the center)

What problem think that today *Pushthi* will be given in the morning a little far there was problem in going. Used to go with difficulty walking. If it is far going there by walking is problem (15). It was so far from here like about one mile (2). Means a little far that’s it, that’s why being daughter in law couldn’t go, then delivered at home that’s it. Considering the distance since daughter in law so didn’t go. *Pushthi* center is a little far that’s it. For that many woman went and ate that’s it. Isn’t a problem I didn’t go myself. Isn’t water there! Otherwise a little far a little problem for this didn’t go that’s it (10). Half an hour it takes or do not remember. Quite far adjacent to Shanti Nagar (17).

(Morbidity)

I ate less, I felt headache and weak (35). Like this again it is seen at times or doesn’t feel good eat something else, that’s all like this. Again it is seen that eat 2 times, physically sick, for this cannot eat don’t eat (17). Since then think when I felt bad do not take. Had stomach spasm so they advised do not take took in full stomach. So....at that time could not eat at all. So how can I eat in full stomach? So for that when could eat.....at that time started taking. Stopped for some days in between, stomach used



to have contraction said take in between meals, “your stomach will have no contraction if you take in between meals”, so at that time could not eat where from I would have eaten in between meals. Now can eat also take the tablet. Could have taken but due that problem that’s why didn’t take (11). This 5 days that I am staying (at the hospital) ----(respondent starts talking). Here, came once on last Saturday, they took my blood sample and checked my Blood pressure. Report has not been given till now. After that till now my report has not been delivered, says, now may go and collect the report later, then the whole day on Saturday I remained here then the phoned village nurse Kanij Fatema (at CHRW). She. again called me over phone, you have problem with blood pressure, you will have to go. So I am coming here, after that they said you must get admitted. Ok, I will get admitted, I am staying since then (7). I remain most of the time sick-for that couldn’t go to hospital. But after being very sick was in hospital for 8 days. Had pain on two side of body/belly and had headache (8).

(Forgetfulness)

I took iron tabs at night when I could remember for taking. When I couldn’t remember I didn’t take. If I couldn’t remember then I didn’t take. Or, sometimes I felt lazy (39). What’s the benefit! They are telling beneficial time and again telling. I don’t have habit of taking medicine that’s why do not remember about taking medicine. Whenever go enquires “have you taken medicine” a lie has to be stated, in reality I do not remember, the day I remember take that day (18). Started from the very beginning of my pregnancy period. Khadiza Apa gave me that but I took it a day and did not eat the next day. I forgot to take. Khadiza Apa felt angry. She told that this is a vitamin tablet and it increased my food consumption quality. And also created blood for my body. But I forgot to take it daily. I often took it a day but forgot to take the next day (20). If I forgot, I tried to remind me, “Did you take your pill? Go to take your pill.” Most of the time, I took my own medicine. If I forgot, they told me to go and take the medicine (38) I took thirty days. But apa(sister), the truth is I dropped it two/one days. Some times I went to my parent’s house and forgot to take it with me (2). Take after 5/6 days when remember take (8).

(Side effect)

I felt some bad smell and I also felt pain to passing of stool. Sometimes I took some times I did not take, but I had only harm(means - problem) that was my constipation. I felt a bad smell. That’s why I did not take more (2). Take many a times on eating there is spasm in the abdomen, stool, doesn’t defecate clearly. Earlier abdomen spasm was there on eating (11).

(Household responsibility)

I mean not every definite day...if there was any problem at home I used to miss visits. I used skip that day. It’s like suppose I had some household chore or suddenly a guest came, couldn’t go then...that sort of trouble (16).

(Out of town)

Happened. Again went to our home for familiarity visit then also closed eating (12)

I went there to collect till I was in my parents-in-law house, but after then the period of 8 months pregnancy I went to my parents’ house and did not get Pushthi (27).

I took thirty days. But apa(sister), the truth is I dropped it two/one days. Some times I went to my parent’s house and forgot to take it with me (2).

[Administrative mistake]

I was not able to get. I was not malnourished. They did not give me pushthi in the time of my three children. My name was not there (26). They didn’t contact with us. So, they didn’t even give us. Doctors advise us to get those packets even from certain places. But, they didn’t give us (4). I did not get. My weight was all right according to them. I had never gone to nutrition centre for taking nutrition (7)

[Reasons to take the supplements]

I took because I need to show the packet to them. Needed to show container(bottle) (2).

## 4. Detailed results from quantitative analysis

### [Appendix 4-1] Descriptions of variables used in the analysis of initiation and utilization

Variable	Number of missing values in the analysis of		Descriptions	Time of measurement	Type
	initiation	utilization			
<b><i>Economic status of the household</i></b>					
Land_area	132	124	Area of land the household owned including homestead, land under cultivation and fallow	enrollment	continuous
Possession_pond/ditch	137	129	Ownership of pond/ditch or family land	enrollment	binary (own vs not own)
Possession_hh items	0	0	Number of house items the woman's household possess	enrollment	continuous
Shoes_owned	3	2	Number of pairs of shoes the woman possessed used to go outside	enrollment	continuous
Clothes_owned	0	0	Total number clothes each woman owned for both ceremonial and daily use	enrollment	continuous
Balanced hh finance	10	10	Perceived balance of household income and expenditure	enrollment	binary (even or surplus vs. deficit)
Food insecurity	694	289	Status of household food insecurity	week 8 and week 30	continuous
Stable income	0	0	Whether or not the household has a stable income source	enrollment	binary (stable income source exist vs. no stable income source exist)
<b><i>Program-related factors</i></b>					
FS group	0	0	FS intervention group	enrollment	binary (early vs. usual)
MNS information	855	767	Whether or not information why the participants should take the pills was provided	week 18	binary (provided vs. not provided)
MNS availability, early	823	-	Whether or not micronutrient pills were available for taking	week 18	binary (available vs. not available)
MNS availability	-	737	A composite variable of availability of micronutrient pills at week 18 and 30	week 18 and week 30	binary (always available vs. ever not available)
FS acceptability	-	1252	Whether or not the food packages did not have unpleasant smell or taste	week 30	binary (acceptable vs. ever experienced something bad)
MNS acceptability, early	823	-	Whether or not the micronutrient pills did not have unpleasant smell or taste	week 18	binary (acceptable vs. ever experienced something bad)
MNS acceptability	-	736	A composite variable of acceptability at week 18 and 30	week 18 and week 30	binary (acceptable vs. ever experienced something bad)
FS side-effects	-	1252	Whether or not the woman experienced any side-effects after consuming the food supplement	week 30	binary (ever experienced vs. no experience)

## [Appendix 4-1] Descriptions of variables used in the analysis of initiation and utilization (cont'd)

Variable	Number of missing values in the analysis of		Descriptions	Time of measurement	Type
	initiation	utilization			
<b><i>Program-related factors (cont'd)</i></b>					
MNS side-effects, early	772	-	Whether or not the woman experienced any side-effects after consuming the micronutrient supplement	week 18	binary (ever experienced vs. no experience)
MNS side-effects	-	134	A composite variable of side-effects at week 18 and 30	week 18 and week 30	binary (ever experienced vs. no experience)
Influence of CNP	-	1254	How much the community nutrition promotor influenced on the woman's consumption supplements	week 30	binary (no influence vs. some influence)
Distribution_time	-	1273	Whether or not the timing of distribution of food supplement was convenient or not	week 30	binary (convenient vs. not convenient)
Distance to CNC	-	1256	Feeling about the distance to community nutrition center	week 30	binary (far vs. close)
Waiting time at CNC	-	1271	Feeling about the waiting time at the community nutrition center	week 30	binary (acceptable vs. long)
<b><i>Beliefs</i></b>					
Sicknesses, early	222	-	Number of sickness episodes experienced during the last 30 days or since the last visit	week 8 and week 14,	continuous
Sicknesses	-	213	Mean number of sickness episodes over entire pregnancy period	week 8, 14, 18, 22, 26, 30, and 34	continuous
Health problems, early	222		Whether or not the woman had any health problems at each visit	week 8 and week 14,	continuous
Health problems	-	213	Degree of having health problems over entire pregnancy period (mean)	week 8, 14, 18, 22, 26, 30, and 34	continuous
Physical weakness, early	222		Whether or not the woman felt physical weakness during the last 30 days	week 8 and week 14,	continuous
Physical weakness	-	213	Degree of feeling weakness over entire pregnancy period (mean)	week 8, 14, 18, 22, 26, 30, and 34	continuous
Pre-pregnancy weight	530	490	Pre-pregnancy weight	Enrollment	continuous
Previous preg experiences	2	2	Previous pregnancy experience including pre-eclampsia/eclampsia, congenital abnormality, induced abortion, stillbirth, cesarean delivery	week 8	binary (experienced abnormal birth outcomes vs. did not experienced abnormal birth outcomes)
Pre-pregnancy BMI	534	494	Pre-pregnancy weight	Enrollment	continuous
Previous dx experiences	0	0	Previous diseases experiences including high blood pressure, diabetes, goiter, heart disease, and infections	week 8	binary (experienced diseases vs. did not experienced diseases)

## [Appendix 4-1] Descriptions of variables used in the analysis of initiation and utilization (cont'd)

Variable	Number of missing values in the analysis of		Descriptions	Time of measurement	Type
	initiation	utilization			
<i>Attitudes</i>					
MNS positive perceptions	1441	1365	Awareness of any positive effects of iron tablets	week 8	binary (be aware of vs. do not know)
MNS negative perceptions	1416	1254	Awareness of any negative effect of iron tablets	week 8	binary (be aware of vs. do not know)
Pill importance, ill, early	1499	-	Perceptions on the importance of taking iron tablet when sick	week 8	binary (important vs. not important)
Pill importance, ill	-	1419		week 8 and week 30	binary (important vs. not important)
Pill importance, healthy, early	1500	-	Perceptions on the importance of taking iron tablet when healthy	week 8	binary (important vs. not important)
Pill importance, healthy	-	1420		week 8 and week 30	binary (important vs. not important)
Days to affect, early	992	-	Number of days needed until the woman recognize whether the iron tablet had an effect or not	week 8	continuous
Days to affect		912		week 8 and week 30 (mean)	continuous
FS effects, strength	-	1252	Whether or not the woman ever experienced any changes in strength after taking the food supplements	week 30	binary (no change vs. some changes)
FS effects, health	-	1252	Whether or not the woman ever experienced any changes in health after taking the food supplements	week 30	binary (no change vs. some changes)
FS effects, weight	-	1252	Whether or not the woman ever experienced any changes in weight after taking the food supplements	week 30	binary (no change vs. some changes)
MNS effects, appetite, early	828	-	Whether or not the woman ever experienced any changes in appetite after taking the micronutrient supplements	week 18	binary (negative or no effect vs. some effects)
MNS effects, appetite	-	741		week 18 and week 30	binary (negative or no effect vs. some effects)
MNS effects, strength, early	827	-	Whether or not the woman ever experienced any changes in strength after taking the micronutrient supplements	week 18	binary (negative or no effect vs. some effects)
MNS effects, strength	-	740		week 18 and week 30	binary (negative or no effect vs. some effects)
MNS effects, positive, early	827	-	Whether or not the woman ever experienced any positive effects after taking the micronutrient supplements	week 18	binary (negative or no effect vs. some effects)
MNS effects, positive	-	740		week 18 and week 30	binary (negative or no effect vs. some effects)
Weight gains	8	0	Weight gain compared with pre-pregnancy weight	pre-enrollment, week 14, 19, and 30	binary (1: ever experienced increase in wt at least two out of four visits, 0:less than two times of experience in wt gain)
Increase_Hb conc.	-	1	Whether or not hemoglobin concentration had been increased after taking the supplements	Week 14, 19, and 30	binary (0:never, 1:ever experienced increase in Hb, based on hb_change_e and _l)

## [Appendix 4-1] Descriptions of variables used in the analysis of initiation and utilization (cont'd)

Variable	Number of missing values in the analysis of		Descriptions	Time of measurement	Type
	initiation	utilization			
<i><b>Social influences</b></i>					
Living with in-laws	1	1	Whether or not a woman was living with her husband's family members in the same household or bari or not the woman	enrollment	binary (living with husband's family members vs. not living with husband's family membrs)
Living with mother-in-law	1	1	whether or not a woman was living together with her mother-in-law, in particular	enrollment	binary (living with mother-in-law vs. not living with mother-in-law)
Controlling behaviors	-	143	whether or not the woman experienced any domestic violence, particularly controlling behaviors	week 30	binary (ever experienced vs. never)
Physical violence_life	-	143	whether or not the woman experienced any domestic violence, particularly physical violence in her lifetime	week 30	binary (ever experienced vs. never)
Physical violence_preg	-	143	whether or not the woman experienced any domestic violence, particularly physical violence during her pregnancy	week 30	binary (ever experienced vs. never)
Emotional violence_life	-	143	whether or not the woman experienced any domestic violence, particularly emotional violence in her lifetime	week 30	binary (ever experienced vs. never)
Emotional violence_preg	-	143	whether or not the woman experienced any domestic violence, particularly emotional violence during her pregnancy	week 30	binary (ever experienced vs. never)
Sexual violence_life	-	124	whether or not the woman experienced any domestic violence, particularly sexual violence in her lifetime	week 30	binary (ever experienced vs. never)
Sexual violence_preg	-	124	whether or not the woman experienced any domestic violence, particularly sexual violence during her pregnancy	week 30	binary (ever experienced vs. never)
Workload	1024	858	Whether or not the woman ever performed any heavy work during her pregnancy	week 30	binary (ever performed vs. never)
Rest	1024	858	Whether or not the woman took enough rest in the previous day	week 30	binary (took enough rest vs. could not take enough rest)
Influence of husband	-	1258	Whether or not the woman's husband influenced her taking of the supplements	week 30	binary (influenced vs. little or no influences)
Influence of mother-in-law	-	1400	Whether or not the woman's mothe-in-law influenced her taking of the supplements	week 30	binary (influenced vs. little or no influences)

**[Appendix 4-1] Descriptions of variables used in the analysis of initiation and utilization (cont'd)**

Variable	Number of missing values in the analysis of		Descriptions	Time of measurement	Type
	initiation	utilization			
<b><i>Social influences (cont'd)</i></b>					
Influence of father-in-law	-	1686	Whether or not the woman's father-in-law influenced her taking of the supplements	week 30	binary (influenced vs. little or no influences)
Influence of sister-in-law	-	1366	Whether or not the woman's sister-in-law influenced her taking of the supplements	week 30	binary (influenced vs. little or no influences)
Influence of others	-	1265	Whether or not the woman's neighbors or friends influenced her taking of the supplements	week 30	binary (influenced vs. little or no influences)
<b><i>Autonomy</i></b>					
Mobility	1236	1166	Degree of mobility to visit some places (sum)	enrollment	continuous
Permission	1249	1179	Degree of permission needed to visit some places (sum)	enrollment	continuous
Control over finance	1280	1208	Degree of authority to control money from various sources (sum)	enrollment	continuous
Purchase	1667	1578	Degree of authority in purchasing or spending money of household (sum)	enrollment	continuous
Decision_making	1233	1163	Degree of self-influence on making decisions on various situations (sum)	enrollment	continuous
NGO membership	1233	1163	Whether or not the woman was a member of any organized group at the time of study	enrollment	binary (membership vs. no membership)
Earned income	0	0	Whether or not the woman had earned income	enrollment	binary (earned income exist vs. no earned income exist)
<b><i>Variables controlled</i></b>					
Season at enrollment	0	0	Season at enrollment	enrollment	binary (lean vs. non-lean period)
GA at enrollment	0	0	Gestational age at enrollment	enrollment	continuous

## [Appendix 4-2] Crude and adjusted odds ratio for factors in initiating food and both types of supplementation among MINIMat participants

Construct and variables	Food supplementation			Combined supplementation		
	N	Crude	Adjusted†	N	Crude	Adjusted
<b>Demographic characteristics</b>						
Maternal age	3777	1.045 (1.025, 1.066) <.0001††	1.045 (1.024, 1.065), <.0001	3724	1.046 (1.026, 1.066), <.0001	1.046 (1.025, 1.066), <.0001
Parity	3775	1.275 (1.160, 1.402), <.0001	1.272 (1.158, 1.398), <.0001	3722	1.272 (1.158, 1.398), <.0001	1.270 (1.156, 1.395), <.0001
Years of education	3781	0.907 (0.882, 0.932), <.0001	0.907 (0.882, 0.932), <.0001	3728	0.910 (0.886, 0.935), <.0001	0.910 (0.885, 0.935), <.0001
<b>Cultural perceptions and practices</b>						
Delivery_concern	2549	0.568 (0.417, 0.774), 0.0003	0.561 (0.412, 0.764), 0.0003	2516	0.588 (0.435, 0.797), 0.0006	0.581 (0.429, 0.787), 0.0005
Delivery_fear	2546	0.605 (0.407, 0.898), 0.0126	0.598 (0.403, 0.889), 0.0111	2513	0.687 (0.472, 1.001), 0.0506	0.679 (0.466, 0.990), 0.0443
Baby_size	2546	0.839 (0.600, 1.173), 0.3049	0.835 (0.597, 1.168), 0.2927	2513	0.908 (0.656, 1.257), 0.5611	0.903 (0.652, 1.250), 0.5373
Size_concern	2548	0.873 (0.672, 1.135), 0.3107	0.864 (0.665, 1.124), 0.2758	2515	0.883 (0.681, 1.145), 0.3490	0.873 (0.673, 1.132), 0.3059
Fear_evil spirit	2548	0.656 (0.492, 0.876), 0.0043	0.665 (0.498, 0.888), 0.0057	2515	0.645 (0.484, 0.859), 0.0027	0.653 (0.490, 0.872), 0.0037
Intake_amount (more vs same or less)	2547	0.858 (0.647, 1.137), 0.2857	0.854 (0.644, 1.133), 0.2729	2514	0.898 (0.681, 1.185), 0.4484	0.895 (0.678, 1.182), 0.4336
Ration_discomfort	2546	0.657 (0.506, 0.852), 0.0015	0.650 (0.501, 0.844), 0.0012	2513	0.652 (0.504, 0.844), 0.0012	0.646 (0.499, 0.836), 0.0009
Outside_discomfort	2547	0.996 (0.767, 1.293), 0.9754	1.007 (0.776, 1.308), 0.9561	2514	0.999 (0.772, 1.294), 0.9967	1.010 (0.780, 1.308), 0.9386
Burkha use	3781	0.667 (0.537, 0.830), 0.0003	0.663 (0.533, 0.824), 0.0002	3728	0.683 (0.550, 0.848), 0.0006	0.678 (0.546, 0.842), 0.0004
<b>Economic status of the household</b>						
Land area	3649	0.998 (0.998, 0.999), <.0001	0.998 (0.998, 0.999), <.0001	3599	0.998 (0.998, 0.999), <.0001	0.998 (0.998, 0.999), <.0001
Possession_pond/ditch	3644	1.186 (0.922, 1.525), 0.1839	1.172 (0.911, 1.508), 0.2166	3594	1.218 (0.949, 1.562), 0.1211	1.203 (0.938, 1.544), 0.1462
Possession_hh items	3781	0.922 (0.879, 0.968), 0.0010	0.918 (0.875, 0.963), 0.0005	3728	0.926 (0.882, 0.971), 0.0015	0.921 (0.878, 0.966), 0.0008
Shoes owned	3778	0.785 (0.717, 0.860), <.0001	0.785 (0.717, 0.860), <.0001	3725	0.789 (0.720, 0.865), <.0001	0.788 (0.719, 0.864), <.0001
Clothes owned	3781	0.964 (0.952, 0.976), <.0001	0.964 (0.952, 0.976), <.0001	3728	0.965 (0.953, 0.977), <.0001	0.965 (0.953, 0.977), <.0001
Balanced hh finance	3771	0.784 (0.583, 1.054), 0.1067	0.792 (0.589, 1.065), 0.1225	3718	0.805 (0.601, 1.077), 0.1441	0.812 (0.606, 1.088), 0.1626
Stable income	3781	0.729 (0.587, 0.907), 0.0045	0.736 (0.591, 0.915), 0.0058	3728	0.751 (0.605, 0.932), 0.0094	0.756 (0.609, 0.939), 0.0115
Food insecurity	3074	0.981 (0.953, 1.011), 0.2211	0.981 (0.952, 1.010), 0.2012	3034	0.986 (0.957, 1.015), 0.3324	0.985 (0.956, 1.014), 0.3041

† Odds ratios are adjusted for gestational age and season at enrollment

††OR (95% CI), p-value

**[Appendix 4-2] Crude and adjusted odds ratio for factors in initiating food and both supplementation among MINIMat participants (cont'd)**

Construct and variables	Food supplementation			Combined supplementation		
	N	Crude	Adjusted <sup>†</sup>	N	Crude	Adjusted
<b>Program-related factors</b>						
Food group (usual vs. early)	3781	3.515 (2.738, 4.511), <.0001 <sup>††</sup>	3.503 (2.729, 4.497), <.0001	3728	3.257 (2.550, 4.161), <.0001	3.249 (2.543, 4.152), <.0001
MNs information		meaningless	meaningless	2926	0.717 (0.373, 1.379), 0.3188	0.732 (0.380, 1.408), 0.3493
MNs availability		meaningless	meaningless	2958	0.737 (0.295, 1.838), 0.5123	0.726 (0.291, 1.814), 0.4930
<b>Beliefs</b>						
Sicknesses, early	2920	1.030 (0.951, 1.116), 0.4659 <sup>††</sup>	1.028 (0.949, 1.114), 0.4996	2920	1.009 (0.936, 1.087), 0.8142	1.007 (0.935, 1.086), 0.8459
Health problems, early	2918	0.901 (0.672, 1.208), 0.4859	0.888 (0.662, 1.190), 0.4261	2918	0.817 (0.618, 1.079), 0.1546	0.807 (0.610, 1.067), 0.1325
Physical weakness, early	2918	0.806 (0.451, 1.439), 0.4650	0.809 (0.453, 1.446), 0.4749	2918	0.854 (0.503, 1.448), 0.5572	0.856 (0.504, 1.451), 0.5629
Pre-pregnancy weight	3251	0.975 (0.957, 0.993), 0.0065	0.975 (0.957, 0.993), 0.0067	3205	0.976 (0.958, 0.994), 0.0079	0.976 (0.958, 0.994), 0.0078
Previous preg experiences	3779	1.304 (0.911, 1.867), 0.1473	1.297 (0.906, 1.858), 0.1554	3726	1.340 (0.936, 1.919), 0.1094	1.336 (0.933, 1.913), 0.1138
Pre-pregnancy BMI	3247	0.953 (0.909, 0.999), 0.0440	0.953 (0.909, 0.999), 0.0471	3201	0.953 (0.920, 0.999), 0.0454	0.954 (0.910, 1.000), 0.0482
Previous diseases experiences	3781	1.178 (0.787, 1.762), 0.4267	1.168 (0.780, 1.749), 0.4520	3728	1.200 (0.802, 1.796), 0.3745	1.189 (0.794, 1.782), 0.3998
Weight gain, early	3139	1.062 (0.983, 1.147), 0.1285	1.071 (0.990, 1.159), 0.0868	3129	1.054 (0.976, 1.138), 0.1806	1.063 (0.983, 1.149), 0.1265
<b>Attitudes</b>						
MNS_positive perceptions	2340	1.063 (0.754, 1.498), 0.7283	1.052 (0.746, 1.483), 0.7737	2312	1.126 (0.805, 1.574), 0.4889	1.114 (0.796, 1.559), 0.5279
MNS_negative perceptions	2339	0.969 (0.647, 1.452), 0.8802	0.981 (0.654, 1.471), 0.9253	2312	0.993 (0.663, 1.487), 0.9721	1.006 (0.671, 1.508), 0.9779
Pill importance, ill	2282	0.807 (0.572, 1.138), 0.2214	0.802 (0.568, 1.132), 0.2097	2255	0.814 (0.579, 1.145), 0.2380	0.809 (0.575, 1.139), 0.2248
Pill importance, healthy	2281	1.048 (0.632, 1.739), 0.8558	1.048 (0.631, 1.740), 0.8564	2254	1.009 (0.615, 1.655), 0.9726	1.008 (0.614, 1.656), 0.9738
Days to affect	1761	0.990 (0.981, 0.998), 0.0191	0.990 (0.981, 0.998), 0.0206	1736	0.990 (0.981, 0.999), 0.0252	0.990 (0.981, 0.999), 0.0271
<b>Social influences</b>						
Living with mother-in-law	3780	1.297 (1.025, 1.643), 0.0306	1.293 (1.021, 1.637), 0.0330	3727	1.279 (1.011, 1.617), 0.0403	1.275 (1.008, 1.612), 0.0431
Living with in-law	3780	1.818 (1.395, 2.369), <.0001	1.803 (1.384, 2.351), <.0001	3727	1.793 (1.378, 2.334), <.0001	1.781 (1.368, 2.318), <.0001

<sup>†</sup> Odds ratios are adjusted for gestational age and season at enrollment

<sup>††</sup>OR (95% CI), p-value



**[Appendix 4-2] Crude and adjusted odds ratio for factors in initiating food and both types of supplementation among MINIMat participants (cont'd)**

Construct and variables	Food supplementation			Combined supplementation		
	N	Crude	Adjusted <sup>†</sup>	N	Crude	Adjusted
<b>Autonomy</b>						
Mobility	2545	1.063 (0.965, 1.170), 0.2136 <sup>††</sup>	1.062 (0.965, 1.170), 0.2195	2512	1.083 (0.984, 1.192), 0.1013	1.083 (0.984, 1.192), 0.1021
Permission	2532	0.939 (0.855, 1.032), 0.1909	0.941 (0.857, 1.034), 0.2071	2499	0.946 (0.862, 1.038), 0.2429	0.948 (0.864, 1.041), 0.2634
Handle	2501	1.299 (1.137, 1.484), 0.0001	1.294 (1.133, 1.479), 0.0001	2468	1.321 (1.157, 1.509), <.0001	1.317 (1.153, 1.504), <.0001
Purchase	2114	1.022 (0.965, 1.083), 0.4567	1.022 (0.965, 1.083), 0.4539	2114	1.033 (0.979, 1.091), 0.2389	1.033 (0.978, 1.091), 0.2422
Self decision-making	2548	1.062 (0.998, 1.129), 0.0576	1.059 (0.995, 1.127), 0.0710	2515	1.075 (1.011, 1.143), 0.0207	1.073 (1.009, 1.141), 0.0256
NGO participation	2548	1.726 (1.257, 2.371), 0.0007	1.696 (1.234, 2.330), 0.0011	2515	1.735 (1.267, 2.376), 0.0006	1.704 (1.243, 2.336), 0.0009
Earned income	3781	1.576 (0.977, 2.542), 0.0622	1.563 (0.969, 2.523), 0.0672	3728	1.609 (0.997, 2.595), 0.0512	1.593 (0.987, 2.571), 0.0564
<b>Variables controlled</b>						
Season at enrollment (lean vs. non-lean periods)	3781	1.348 (1.038, 1.752), 0.0253	1.344 (1.034, 1.746), 0.0271	3728	1.339 (1.032, 1.737), 0.0281	1.334 (1.028, 1.731), 0.0304
GA at enrollment	3781	0.964 (0.919, 1.012), 0.1403	0.968 (0.922, 1.016)	3728	0.965 (0.920, 1.012), 0.1377	0.966 (0.922, 1.013), 0.1511

<sup>†</sup> Odds ratios are adjusted for food intervention group and gestational age and season at enrollment

<sup>††</sup>OR (95% CI), p-value

**[Appendix 4-3] Factors associated with durations of utilizing food, micronutrient, and combined supplementation among MINIMat participants**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Demographic characteristics</b>									
Maternal age	3271	0.027	<.0001	3590	0.013	<.0001	3268	0.040	<.0001
Parity	3269	0.120	<.0001	3588	0.055	<.0001	3266	0.173	<.0001
Years of education	3272	-0.039	<.0001	3591	-0.006	0.0213	3269	-0.044	<.0001
<b>Cultural perceptions and practices</b>									
Delivery_fear	2471	-0.073	0.4565	2729	0.029	0.5136	2468	-0.050	0.6807
Size_concern	2471	0.034	0.5477	2729	-0.021	0.3997	2468	0.026	0.7074
Baby_size	2471	-0.284	0.0459	2729	0.006	0.9175	2468	-0.309	0.0792
Intake_amount	2470	-0.020	0.7208	2728	-0.018	0.4749	2467	-0.049	0.4842
Fear_evilspirit	2471	0.008	0.8933	2729	-0.017	0.5116	2468	0.008	0.9115
Ration_discomfort	2470	-0.316	<.0001	2728	-0.076	0.0080	2467	-0.390	<.0001
Outside_discomfort	2469	-0.120	0.5067	2727	0.119	0.1462	2466	0.035	0.8755
Delivery_concern	2471	-0.039	0.5264	2729	0.107	<.0001	2468	0.061	0.4176
<i>Burkha</i> use	3272	-0.163	0.0011	3591	0.016	0.4624	3269	-0.138	0.0264
<b>Economic status of the household</b>									
Land_area	3159	-0.001	0.0017	3467	0.000	0.4954	3156	-0.001	0.0095
Possession_pond/ditch	3154	-0.169	0.0044	3462	-0.051	0.0522	3151	-0.189	0.0100
Possession_hh items	3272	-0.054	<.0001	3591	-0.003	0.4676	3269	-0.054	<.0001
Clothes_owned	3272	-0.015	<.0001	3591	-0.004	0.0077	3269	-0.018	<.0001
Shoes_owned	3270	-0.130	<.0001	3589	-0.027	0.0101	3267	-0.157	<.0001
Food insecurity	2983	-0.013	0.0841	3273	-0.005	0.1889	2980	-0.018	0.0622
Balanced hh finance	3264	-0.107	0.0853	3581	-0.066	0.0167	3261	-0.183	0.0172
Stable income	3272	-0.216	<.0001	3591	-0.025	0.2621	3269	-0.244	<.0001

**[Appendix 4-3] Factors associated with durations of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Program-related factors</b>									
FS acceptability	2018	0.061	0.4516	2037	-0.023	0.5704	2017	0.032	0.7507
FS side-effects	2018	0.212	0.0014	2037	0.036	0.2765	2017	0.252	0.0024
MNS information	2616	0.106	0.3933	2830	0.010	0.8873	2615	0.140	0.3917
MNS availability	3136	0.152	0.0294	3416	0.209	<.0001	3135	0.350	<.0001
MNS acceptability	3137	0.021	0.2584	3417	0.045	0.1483	3136	0.139	0.0922
MNS side-effects	3136	0.156	0.0069	3416	0.183	<.0001	3135	0.332	<.0001
Distribution time	1997	-0.027	0.7341	2016	0.067	0.0894	1996	0.052	0.6060
Distance to CNC	2014	-0.184	0.0045	2033	-0.002	0.9428	2013	-0.190	0.0189
Waiting time at CNC	1999	-0.113	0.1390	2016	0.025	0.5130	1998	-0.090	0.3454
Influence of CNP	2016	0.024	0.8813	2035	0.147	0.0625	2015	0.188	0.3455
'Early' FS group	3272	-1.114	<.0001	3591	0.004	0.8633	3269	-1.082	<.0001
<b>Beliefs</b>									
Sickneeses	2339	0.077	<.0001	2554	0.045	<.0001	2337	0.123	<.0001
Health_problems	3272	0.505	<.0001	3591	0.222	<.0001	3269	0.745	<.0001
Physical weakness	3272	0.318	<.0001	3591	0.103	<.0001	3269	0.403	<.0001
Previous preg experiences	3270	0.147	0.0456	3589	0.044	0.1824	3267	0.216	0.0177
Previous dx experiences	3272	0.155	0.0696	3591	-0.017	0.6579	3269	0.161	0.1285
Pre-pregnancy weight	2851	-0.005	0.2580	3105	0.000	0.9284	2849	-0.004	0.4321
Pre-pregnancy BMI	2847	-0.005	0.6416	3101	0.004	0.4510	2845	-0.002	0.8899
<b>Attitudes</b>									
MNS positive perceptions	2017	0.154	0.0592	2231	0.114	0.0011	2015	0.273	0.0059
MNS negative perceptions	2017	-0.014	0.8815	2231	0.058	0.1526	2015	0.050	0.6675
Pill importance, ill	2726	0.066	0.2714	3002	0.039	0.1433	2724	0.101	0.1726

**[Appendix 4-3] Factors associated with durations of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Attitudes (cont'd)</b>									
Pill importance, healthy	2602	0.208	0.0564	2871	0.133	0.0056	2600	0.297	0.0270
Days to affect	2434	0.004	0.0795	2683	0.002	0.0360	2432	0.007	0.0148
FS effects, strength	2018	0.294	<.0001	2037	0.086	0.0080	2017	0.387	<.0001
FS effects, health	2018	0.241	0.0002	2037	0.056	0.0810	2017	0.302	0.0002
FS effects, weight	2018	0.391	<.0001	2037	0.096	0.0084	2017	0.491	<.0001
MNS effects, appetite	3136	0.247	<.0001	3416	0.163	<.0001	3135	0.421	<.0001
MNS effects, strength	3136	0.198	0.0004	3416	0.131	<.0001	3135	0.326	<.0001
MNS effects, positive	3135	0.284	<.0001	3415	0.161	<.0001	3134	0.429	<.0001
Increase_Hb conc.	3271	0.020	0.7028	3589	0.064	0.0054	3268	0.090	0.1574
Weight gains	3272	0.589	<.0001	3591	0.399	<.0001	3269	0.998	<.0001
<b>Social influences</b>									
Living with mother-in-law	3271	-0.075	0.1795	3590	-0.055	0.0282	3268	-0.134	0.0531
Living with in-laws	3271	0.076	0.2835	3590	-0.055	0.0733	3268	0.003	0.9695
Contolling behaviors	3147	-0.039	0.4558	3450	-0.082	0.0008	3145	-0.113	0.0860
Physical violence_life	3147	0.144	0.0174	3450	-0.036	0.2168	3145	0.108	0.1582
Physical violence_preg	3147	-0.140	0.1436	3450	-0.140	0.0019	3145	-0.255	0.0339
Emotional violence_life	3147	-0.033	0.5648	3450	-0.062	0.0188	3145	-0.088	0.2188
Emotional violence_preg	3147	-0.087	0.2110	3450	-0.100	0.0021	3145	-0.175	0.0457
Sexual violence_life	3147	0.003	0.9636	3450	0.023	0.4147	3145	0.034	0.6437
Sexual violence_preg	3147	0.032	0.6725	3450	0.001	0.9680	3145	0.046	0.6242
Workload	2498	-0.046	0.4395	2739	0.009	0.7626	2497	-0.047	0.5345
Rest	2498	-0.052	0.3625	2739	-0.028	0.3271	2497	-0.092	0.2101

**[Appendix 4-3] Factors associated with durations of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Social influences (cont'd)</b>									
Influence of husband	2012	0.210	0.0015	2031	0.073	0.0271	2011	0.288	0.0005
Influence of mother-in-law	1870	-0.082	0.2311	1888	0.018	0.5831	1869	-0.070	0.4155
Influence of father-in-law	1584	-0.022	0.7911	1600	-0.020	0.6279	1583	-0.049	0.6313
Influence of sister-in-law	1904	-0.019	0.7785	1922	-0.005	0.8887	1903	-0.030	0.7170
Influence of others	2005	0.076	0.2661	2024	-0.036	0.2896	2004	0.033	0.6977
<b>Autonomy</b>									
Mobility	2196	0.042	0.0619	2428	0.013	0.1942	2193	0.054	0.0507
Permission	2184	-0.042	0.0583	2415	-0.014	0.1529	2181	-0.064	0.0195
Control over finance	2156	0.057	0.0443	2386	0.056	<.0001	2153	0.113	0.0013
Purchase	1831	0.036	0.0075	2017	0.017	0.0042	1829	0.053	0.0012
Decision_making	2199	0.039	0.0068	2431	0.014	0.0288	2196	0.054	0.0026
NGO membership	2199	0.287	<.0001	2431	0.046	0.1103	2196	0.320	<.0001
Earned income	3272	0.231	0.0101	3591	0.067	0.1018	3269	0.286	0.0101
<b>Variables controlled</b>									
GA at enrollment	3272	-0.057	<.0001	3591	-0.047	<.0001	3269	-0.106	<.0001
Season at enrollment	3272	-0.192	0.0005	3591	-0.048	0.0532	3269	-0.230	0.0008

**[Appendix 4-4] Factors associated with intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Demographic characteristics</b>									
Maternal age	3271	0.005	<.0001	3590	0.004	<.0001	3268	0.021	<.0001
Parity	3269	0.022	<.0001	3588	0.013	<.0001	3266	0.080	<.0001
Years of education	3272	-0.011	<.0001	3591	-0.002	0.0071	3269	-0.025	<.0001
<b>Cultural perceptions and practices</b>									
Delivery_fear	2471	-0.063	0.0003	2729	-0.002	0.8236	2468	-0.139	0.0068
Size_concern	2471	0.011	0.2754	2729	-0.007	0.2609	2468	0.002	0.9590
Baby_size	2471	-0.014	0.5935	2729	0.014	0.3797	2468	-0.003	0.9718
Intake_amount	2470	-0.007	0.4850	2728	0.006	0.3741	2467	0.015	0.6075
Fear_evilspirit	2471	-0.004	0.7065	2729	-0.008	0.1828	2468	-0.031	0.2963
Ration_discomfort	2470	-0.071	<.0001	2728	-0.031	<.0001	2467	-0.231	<.0001
Outside_discomfort	2469	-0.063	0.0508	2727	0.008	0.6768	2466	-0.106	0.2621
Delivery_concern	2471	-0.018	0.0945	2729	0.033	<.0001	2468	0.029	0.1412
<i>Burkha</i> use	3272	-0.051	<.0001	3591	0.014	0.0096	3269	-0.055	0.0378
<b>Economic status of the household</b>									
Land_area	3159	0.000	<.0001	3467	-4.2551E	0.8691	3156	-0.001	<.0001
Possession_pond/ditch	3154	-0.045	<.0001	3462	-0.006	0.3354	3151	-0.097	0.0018
Possession_hh items	3272	-0.014	<.0001	3591	0.000	0.6902	3269	-0.024	<.0001
Clothes_owned	3272	-0.003	<.0001	3591	-0.001	0.0061	3269	-0.009	<.0001
Shoes_owned	3270	-0.026	<.0001	3589	-0.006	0.0223	3267	-0.064	<.0001
Food insecurity	2983	-0.005	0.0009	3273	0.000	0.9821	2980	-0.008	0.0398
Balanced hh finance	3264	-0.018	0.1075	3581	-0.026	0.0001	3261	-0.103	0.0015
Stable income	3272	-0.034	<.0001	3591	-0.001	0.8157	3269	-0.066	0.0112

**[Appendix 4-4] Factors associated with intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Program-related factors</b>									
FS acceptability	2018	0.059	<.0001	2037	0.017	0.0604	2017	0.161	0.0001
FS side-effects	2018	0.058	<.0001	2037	0.014	0.0585	2017	0.161	<.0001
MNS information	2616	0.018	0.3824	2830	0.028	0.0477	2615	0.107	0.0904
MNS availability	3136	0.010	0.4036	3416	0.043	<.0001	3135	0.144	<.0001
MNS acceptability	3137	0.018	0.1283	3417	0.034	<.0001	3136	0.144	<.0001
MNS side-effects	3136	0.008	0.4128	3416	0.021	0.0012	3135	0.076	0.0110
Distribution time	1997	-0.065	<.0001	2016	0.003	0.7710	1996	-0.121	0.0030
Distance to CNC	2014	-0.101	<.0001	2033	0.000	0.9659	2013	-0.201	<.0001
Waiting time at CNC	1999	-0.049	0.0002	2016	-0.010	0.2524	1998	-0.129	0.0009
Influence of CNP	2016	0.096	0.0005	2035	-0.044	0.0161	2015	0.062	0.4504
'Early' FS group	3272	-0.159	<.0001	3591	0.010	0.0727	3269	-0.279	<.0001
<b>Beliefs</b>									
Sickneeses	2339	-0.002	0.4523	2554	0.008	<.0001	2337	0.018	0.0364
Health_problems	3272	-0.013	0.1304	3591	0.053	<.0001	3269	0.126	<.0001
Physical weakness	3272	-0.003	0.7446	3591	0.015	0.0075	3269	0.028	0.2812
Previous preg experiences	3270	0.007	0.6066	3589	0.019	0.0225	3267	0.071	0.0685
Previous dx experiences	3272	-0.005	0.7275	3591	0.003	0.7700	3269	0.018	0.6945
Pre-pregnancy weight	2851	-0.002	0.0258	3105	0.000	0.6109	2849	-0.003	0.1659
Pre-pregnancy BMI	2847	-0.002	0.2536	3101	0.000	0.9927	2845	-0.004	0.5155
<b>Attitudes</b>									
MNS positive perceptions	2017	0.040	0.0049	2231	0.058	<.0001	2015	0.258	<.0001
MNS negative perceptions	2017	0.000	0.9868	2231	-0.007	0.4687	2015	-0.041	0.4009
Pill importance, ill	2726	0.016	0.1306	3002	0.014	0.0285	2724	0.072	0.0192

**[Appendix 4-4] Factors associated with intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Attitudes (cont'd)</b>									
Pill importance, healthy	2602	0.021	0.2855	2871	0.023	0.0459	2600	0.104	0.0634
Days to affect	2434	0.001	0.0088	2683	0.001	<.0001	2432	0.005	<.0001
FS effects, strength	2018	0.123	<.0001	2037	0.030	<.0001	2017	0.333	<.0001
FS effects, health	2018	0.089	<.0001	2037	0.022	0.0031	2017	0.241	<.0001
FS effects, weight	2018	0.127	<.0001	2037	0.020	0.0160	2017	0.312	<.0001
MNS effects, appetite	3136	0.048	<.0001	3416	0.064	<.0001	3135	0.278	<.0001
MNS effects, strength	3136	0.046	<.0001	3416	0.054	<.0001	3135	0.242	<.0001
MNS effects, positive	3135	0.069	<.0001	3415	0.068	<.0001	3134	0.322	<.0001
Increase_Hb conc.	3271	0.000	0.9622	3589	0.006	0.2581	3268	0.020	0.4700
Weight gains	3272	0.028	0.1053	3591	0.092	<.0001	3269	0.279	<.0001
<b>Social influences</b>									
Living with mother-in-law	3271	-0.026	0.0081	3590	-0.010	0.0933	3268	-0.085	0.0040
Living with in-laws	3271	-0.015	0.2328	3590	-0.003	0.6953	3268	-0.049	0.1887
Controlling behaviors	3147	-0.017	0.0631	3450	-0.017	0.0025	3145	-0.076	0.0052
Physical violence_life	3147	0.025	0.0197	3450	0.002	0.8233	3145	0.043	0.1770
Physical violence_preg	3147	-0.026	0.1238	3450	-0.020	0.0533	3145	-0.108	0.0303
Emotional violence_life	3147	-0.014	0.1512	3450	-0.012	0.0523	3145	-0.059	0.0474
Emotional violence_preg	3147	-0.024	0.0514	3450	-0.018	0.0157	3145	-0.093	0.0104
Sexual violence_life	3147	0.000	0.9943	3450	-0.002	0.7406	3145	0.000	0.9894
Sexual violence_preg	3147	-0.002	0.8687	3450	-0.020	0.0181	3145	-0.059	0.1353
Workload	2498	0.012	0.2324	2739	0.001	0.9133	2497	0.018	0.5517
Rest	2498	0.008	0.4390	2739	-0.001	0.9177	2497	0.012	0.6742



**[Appendix 4-4] Factors associated with intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value	N	Parameter estimate ( $\beta$ )	p-value
<b>Social influences (cont'd)</b>									
Influence of husband	2012	0.038	0.0011	2031	-0.011	0.1637	2011	0.035	0.3008
Influence of mother-in-law	1870	-0.002	0.8978	1888	0.002	0.7942	1869	0.000	0.9928
Influence of father-in-law	1584	0.012	0.4143	1600	0.005	0.6342	1583	0.031	0.4646
Influence of sister-in-law	1904	0.032	0.0061	1922	0.003	0.6763	1903	0.069	0.0467
Influence of others	2005	0.035	0.0031	2024	-0.014	0.0789	2004	0.029	0.4079
<b>Autonomy</b>									
Mobility	2196	0.010	0.0111	2428	0.002	0.3279	2193	0.030	0.0084
Permission	2184	-0.011	0.0043	2415	0.002	0.3274	2181	-0.016	0.1570
Control over finance	2156	0.018	0.0002	2386	0.008	0.0069	2153	0.061	<.0001
Purchase	1831	0.009	0.0001	2017	0.003	0.0277	1829	0.029	<.0001
Decision_making	2199	0.012	<.0001	2431	0.000	0.9175	2196	0.024	0.0011
NGO membership	2199	0.071	<.0001	2431	-0.002	0.7639	2196	0.125	0.0002
Earned income	3272	0.095	<.0001	3591	0.018	0.0677	3269	0.251	<.0001
<b>Variables controlled</b>									
GA at enrollment	3272	-0.002	0.2875	3591	-0.004	0.0015	3269	-0.015	0.0097
Season at enrollment	3272	-0.030	0.0021	3591	-0.006	0.2900	3269	-0.072	0.0136

**[Appendix 4-5] Factors associated with patterns of intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Demographic characteristics</b>									
Maternal age	3271	1.040 (1.026, 1.054)	<.0001	3590	1.040 (1.028, 1.052)	<.0001	3268	1.050 (1.032, 1.069)	<.0001
Parity	3269	1.191 (1.127, 1.258)	<.0001	3588	1.149 (1.095, 1.207)	<.0001	3266	1.192 (1.112, 1.279)	<.0001
Years of education	3272	0.934 (0.916, 0.953)	<.0001	3591	0.989 (0.973, 1.005)	0.1699	3269	0.945 (0.920, 0.970)	<.0001
<b>Cultural perceptions and practices</b>									
Delivery_fear	2471	0.738 (0.546, 0.998)	0.0483	2729	1.077 (0.818, 1.418)	0.5967	2468	0.664 (0.454, 0.972)	0.0353
Size_concern	2471	1.011 (0.842, 1.214)	0.9057	2729	0.888 (0.761, 1.036)	0.1321	2468	0.986 (0.771, 1.261)	0.9092
Baby_size	2471	1.316 (0.807, 2.149)	0.2715	2729	1.050 (0.716, 1.541)	0.8020	2468	1.033 (0.558, 1.914)	0.9175
Intake_amount	2470	0.858 (0.715, 1.029)	0.0979	2728	1.039 (0.891, 1.212)	0.6279	2467	0.925 (0.724, 1.181)	0.5302
Fear_evilspirit	2471	1.041 (0.865, 1.252)	0.6734	2729	0.892 (0.763, 1.043)	0.1535	2468	1.180 (0.922, 1.510)	0.1882
Ration_discomfort	2470	0.633 (0.519, 0.773)	<.0001	2728	0.761 (0.639, 0.906)	0.0022	2467	0.565 (0.437, 0.730)	<.0001
Outside_discomfort	2469	0.462 (0.276, 0.771)	0.0032	2727	0.734 (0.448, 1.203)	0.2201	2466	0.424 (0.234, 0.770)	0.0048
Delivery_concern	2471	0.959 (0.788, 1.168)	0.6769	2729	1.498 (1.261, 1.779)	<.0001	2468	1.367 (1.033, 1.808)	0.0288
<i>Burkha</i> use	3272	0.828 (0.705, 0.973)	0.0216	3591	1.246 (1.089, 1.426)	0.0014	3269	1.049 (0.847, 1.298)	0.6640
<b>Economic status of the household</b>									
Land_area	3159	0.998 (0.997, 0.999)	<.0001	3467	1.000 (1.000, 1.001)	0.6239	3156	0.998 (0.997, 0.999)	0.0058
Possession_pond/ditch	3154	0.736 (0.614, 0.883)	0.0010	3462	0.883 (0.883, 1.035)	0.1246	3151	0.764 (0.600, 0.973)	0.0288
Possession_hh items	3272	0.923 (0.892, 0.954)	<.0001	3591	1.002 (1.002, 1.031)	0.9007	3269	0.929 (0.889, 0.971)	0.0011
Clothes_owned	3272	0.980 (0.968, 0.992)	0.0014	3591	1.000 (1.000, 1.009)	0.9801	3269	0.986 (0.970, 1.003)	0.1015
Shoes_owned	3270	0.839 (0.773, 0.911)	<.0001	3589	0.992 (0.992, 1.058)	0.8104	3267	0.832 (0.743, 0.932)	0.0015
Food insecurity	2983	0.976 (0.953, 1.000)	0.0521	3273	0.998 (0.998, 1.019)	0.8765	2980	0.976 (0.945, 1.008)	0.1363
Balanced hh finance	3264	0.858 (0.707, 1.041)	0.1210	3581	0.860 (0.860, 1.017)	0.0784	3261	0.782 (0.607, 1.007)	0.0565
Stable income	3272	0.783 (0.668, 0.918)	0.0025	3591	0.967 (0.967, 1.105)	0.6207	3269	0.779 (0.628, 0.966)	0.0229

**[Appendix 4-5] Factors associated with patterns of intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Program-related factors</b>									
FS acceptability	2018	1.191 (0.921, 1.539)	0.1822	2037	1.068 (0.855, 1.333)	0.5634	2017	1.120 (0.799, 1.570)	0.5100
FS side-effects	2018	1.341 (1.089, 1.651)	0.0057	2037	1.084 (0.904, 1.300)	0.3826	2017	1.312 (0.996, 1.729)	0.0534
MNS information	2616	1.152 (0.789, 1.682)	0.4639	2830	1.214 (0.878, 1.679)	0.2400	2615	0.975 (0.605, 1.569)	0.9154
MNS availability	3136	0.979 (0.790, 1.214)	0.8483	3416	1.742 (1.437, 2.113)	<.0001	3135	1.388 (1.011, 1.904)	0.0423
MNS acceptability	3137	1.108 (0.906, 1.355)	0.3184	3417	1.529 (1.284, 1.821)	<.0001	3136	1.489 (1.158, 1.914)	0.0019
MNS side-effects	3136	1.171 (0.976, 1.405)	0.0886	3416	1.270 (1.088, 1.481)	0.0024	3135	1.220 (0.952, 1.562)	0.1158
Distribution time	1997	0.780 (0.605, 1.005)	0.0548	2016	1.014 (0.816, 1.259)	0.9022	1996	0.809 (0.578, 1.133)	0.2168
Distance to CNC	2014	0.644 (0.528, 0.786)	<.0001	2033	0.947 (0.794, 1.130)	0.5444	2013	0.821 (0.633, 1.065)	0.1374
Waiting time at CNC	1999	0.730 (0.572, 0.931)	0.0112	2016	0.967 (0.785, 1.190)	0.7497	1998	0.751 (0.542, 1.040)	0.0843
Influence of CNP	2016	1.767 (1.003, 3.113)	0.0490	2035	0.607 (0.393, 0.936)	0.0238	2015	0.936 (0.501, 1.751)	0.8371
'Early' FS group	3272	0.123 (0.100, 0.151)	<.0001	3591	1.067 (0.934, 1.218)	0.3404	3269	0.119 (0.087, 0.164)	<.0001
<b>Beliefs</b>									
Sickneeses	2339	1.001 (0.950, 1.056)	0.9627	2554	1.115 (1.066, 1.166)	<.0001	2337	1.066 (0.995, 1.141)	0.0696
Health_problems	3272	0.988 (0.844, 1.157)	0.8797	3591	1.817 (1.587, 2.081)	<.0001	3269	1.254 (1.013, 1.551)	0.0374
Physical weakness	3272	1.053 (0.899, 1.233)	0.5229	3591	1.187 (1.038, 1.358)	0.0124	3269	1.043 (0.844, 1.290)	0.6946
Previous preg experiences	3270	1.350 (1.079, 1.689)	0.0086	3589	1.223 (1.002, 1.492)	0.0476	3267	1.401 (1.050, 1.871)	0.0219
Previous dx experiences	3272	0.981 (0.747, 1.289)	0.8905	3591	0.860 (0.680, 1.087)	0.2060	3269	0.745 (0.500, 1.110)	0.1479
Pre-pregnancy weight	2851	0.987 (0.974, 1.000)	0.0488	3105	1.007 (0.996, 1.019)	0.1965	2849	0.999 (0.981, 1.016)	0.8859
Pre-pregnancy BMI	2847	0.978 (0.945, 1.012)	0.1971	3101	1.018 (0.990, 1.048)	0.2139	2845	1.002 (0.958, 1.048)	0.9341
<b>Attitudes</b>									
MNS positive perceptions	2017	1.183 (0.905, 1.546)	0.2179	2231	1.810 (1.436, 2.281)	<.0001	2015	1.613 (1.086, 2.395)	0.0178
MNS negative perceptions	2017	1.021 (0.755, 1.382)	0.8910	2231	0.962 (0.746, 1.242)	0.7687	2015	1.005 (0.671, 1.503)	0.9825
Pill importance, ill	2726	1.130 (0.935, 1.367)	0.2067	3002	1.171 (0.997, 1.375)	0.0546	2714	1.174 (0.908, 1.518)	0.2213

**[Appendix 4-5] Factors associated with patterns of intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Attitudes (cont'd)</b>									
Pill importance, healthy	2602	0.937 (0.668, 1.313)	0.7044	2871	1.358 (1.008, 1.831)	0.0445	2600	1.328 (0.804, 2.193)	0.2676
Days to affect	2434	1.006 (0.999, 1.013)	0.0737	2683	1.008 (1.002, 1.014)	0.0089	2432	1.011 (1.003, 1.020)	0.0081
FS effects, strength	2018	1.866 (1.511, 2.304)	<.0001	2037	1.252 (1.047, 1.498)	0.0140	2017	1.726 (1.303, 2.285)	0.0001
FS effects, health	2018	1.450 (1.189, 1.769)	0.0002	2037	1.137 (0.953, 1.358)	0.1547	2017	1.211 (0.934, 1.572)	0.1489
FS effects, weight	2018	1.914 (1.488, 2.461)	<.0001	2037	1.092 (0.893, 1.335)	0.3933	2017	1.609 (1.155, 2.240)	0.0049
MNS effects, appetite	3136	1.422 (1.165, 1.735)	0.0005	3416	1.870 (1.580, 2.214)	<.0001	3135	1.926 (1.429, 2.596)	<.0001
MNS effects, strength	3136	1.272 (1.064, 1.521)	0.0084	3416	1.753 (1.504, 2.043)	<.0001	3135	1.599 (1.239, 2.063)	0.0003
MNS effects, positive	3135	1.513 (1.195, 1.915)	0.0006	3415	1.977 (1.623, 2.407)	<.0001	3134	2.025 (1.411, 2.908)	0.0001
Increase_Hb conc.	3271	0.895 (0.759, 1.056)	0.1880	3589	0.952 (0.828, 1.094)	0.4870	3268	0.862 (0.689, 1.078)	0.1933
Weight gains	3272	1.518 (1.077, 2.140)	0.0172	3591	2.052 (1.544, 2.727)	<.0001	3269	2.254 (1.273, 3.992)	0.0053
<b>Social influences</b>									
Living with mother-in-law	3271	0.880 (0.738, 1.049)	0.1537	3590	0.893 (0.768, 1.038)	0.1392	3268	0.913 (0.721, 1.156)	0.4495
Living with in-laws	3271	1.001 (0.800, 1.253)	0.9931	3590	0.908 (0.753, 1.093)	0.3074	3268	0.884 (0.659, 1.184)	0.4082
Controlling behaviors	3147	0.834 (0.705, 0.985)	0.0327	3450	0.886 (0.770, 1.020)	0.0924	3145	0.827 (0.661, 1.037)	0.0994
Physical violence_life	3147	1.221 (1.013, 1.473)	0.0364	3450	1.005 (0.853, 1.184)	0.9527	3145	1.007 (0.780, 1.302)	0.9549
Physical violence_preg	3147	0.888 (0.653, 1.209)	0.4505	3450	0.819 (0.630, 1.063)	0.1336	3145	0.864 (0.566, 1.319)	0.4995
Emotional violence_life	3147	0.849 (0.708, 1.018)	0.0774	3450	1.066 (0.916, 1.239)	0.4096	3145	0.862 (0.675, 1.100)	0.2329
Emotional violence_preg	3147	0.721 (0.572, 0.910)	0.0058	3450	0.972 (0.808, 1.170)	0.7669	3145	0.794 (0.582, 1.085)	0.1480
Sexual violence_life	3147	1.033 (0.859, 1.242)	0.7283	3450	0.985 (0.841, 1.154)	0.8542	3145	0.897 (0.696, 1.155)	0.3990
Sexual violence_preg	3147	0.881 (0.691, 1.123)	0.3063	3450	0.787 (0.641, 0.967)	0.0227	3145	0.827 (0.591, 1.157)	0.2673
Workload	2498	0.860 (0.712, 1.039)	0.1174	2739	0.956 (0.816, 1.121)	0.5813	2497	0.868 (0.674, 1.117)	0.2707
Rest	2498	1.183 (0.986, 1.419)	0.0707	2739	0.964 (0.827, 1.123)	0.6363	2497	1.159 (0.908, 1.479)	0.2354

**[Appendix 4-5] Factors associated with patterns of intensities of utilizing food, micronutrient, and combined supplementation among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Social influences (cont'd)</b>									
Influence of husband	2012	1.298 (1.055, 1.598)	0.0137	2031	0.849 (0.708, 1.018)	0.0766	2011	1.099 (0.839, 1.439)	0.4941
Influence of mother-in-law	1870	1.002 (0.812, 1.237)	0.9826	1888	0.934 (0.776, 1.125)	0.4728	1869	1.026 (0.779, 1.351)	0.8566
Influence of father-in-law	1584	1.112 (0.862, 1.435)	0.4143	1600	1.113 (0.887, 1.397)	0.3561	1583	1.139 (0.816, 1.588)	0.4443
Influence of sister-in-law	1904	1.095 (0.892, 1.344)	0.3861	1922	0.947 (0.789, 1.136)	0.5575	1903	1.219 (0.929, 1.598)	0.1526
Influence of others	2005	1.193 (0.966, 1.474)	0.1017	2024	0.773 (0.643, 0.930)	0.0063	2004	1.183 (0.894, 1.566)	0.2389
<b>Autonomy</b>									
Mobility	2196	1.092 (1.017, 1.173)	0.0154	2428	1.047 (0.986, 1.111)	0.1325	2193	1.123 (1.021, 1.237)	0.0173
Permission	2184	0.893 (0.830, 0.960)	0.0022	2415	1.051 (0.990, 1.115)	0.1026	2181	0.907 (0.822, 1.000)	0.0505
Control over finance	2156	1.077 (0.985, 1.178)	0.1054	2386	1.075 (0.995, 1.161)	0.0667	2153	1.067 (0.946, 1.203)	0.2930
Purchase	1831	1.067 (1.024, 1.113)	0.0021	2017	1.024 (0.989, 1.061)	0.1844	1829	1.067 (1.011, 1.127)	0.0191
Decision_making	2199	1.116 (1.065, 1.170)	<.0001	2431	1.001 (0.963, 1.041)	0.9657	2196	1.149 (1.078, 1.225)	<.0001
NGO membership	2199	1.434 (1.170, 1.758)	0.0005	2431	0.963 (0.807, 1.151)	0.6803	2196	1.072 (0.812, 1.415)	0.6221
Earned income	3272	1.957 (1.508, 2.538)	<.0001	3591	1.167 (0.914, 1.492)	0.2158	3269	1.850 (1.339, 2.558)	0.0002
<b>Variables controlled</b>									
GA at enrollment	3272	0.981 (0.947, 1.018)	0.3114	3591	0.957 (0.928, 0.986)	0.0045	3269	0.946 (0.900, 0.994)	0.0294
Season at enrollment	3272	0.800 (0.674, 0.950)	0.0109	3591	1.024 (0.881, 1.190)	0.7558	3269	0.928 (0.735, 1.171)	0.5283

**[Appendix 4-6] Factors associated with persistent consumption of food, micronutrient, and combined supplements among MINIMat participants**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Demographic characteristics</b>									
Maternal age	3271	1.051 (1.037, 1.066)	<.0001	3590	1.045 (1.033, 1.058)	<.0001	3268	1.059 (1.039, 1.080)	<.0001
Parity	3269	1.229 (1.161, 1.300)	<.0001	3588	1.172 (1.115, 1.232)	<.0001	3266	1.231 (1.142, 1.327)	<.0001
Years of education	3272	0.926 (0.907, 0.945)	<.0001	3591	0.992 (0.975, 1.009)	0.3393	3269	0.948 (0.921, 0.976)	0.0003
<b>Cultural perceptions and practices</b>									
Delivery_fear	2471	0.765 (0.558, 1.049)	0.0966	2729	1.110 (0.833, 1.478)	0.4774	2468	0.727 (0.477, 1.109)	0.1387
Size_concern	2471	1.067 (0.881, 1.292)	0.5056	2729	0.845 (0.720, 0.991)	0.0388	2468	0.934 (0.715, 1.222)	0.6202
Baby_size	2471	1.204 (0.730, 1.986)	0.4665	2729	1.038 (0.699, 1.541)	0.8526	2468	0.930 (0.489, 1.767)	0.8238
Intake_amount	2470	0.908 (0.751, 1.099)	0.3225	2728	1.032 (0.880, 1.209)	0.7015	2467	0.868 (0.666, 1.132)	0.2961
Fear_evilspirit	2471	0.922 (0.759, 1.121)	0.4169	2729	0.938 (0.798, 1.102)	0.4382	2468	1.249 (0.956, 1.631)	0.1030
Ration_discomfort	2470	0.600 (0.489, 0.738)	<.0001	2728	0.731 (0.611, 0.874)	0.0006	2467	0.518 (0.394, 0.683)	<.0001
Outside_discomfort	2469	0.425 (0.253, 0.714)	0.0012	2727	0.907 (0.545, 1.507)	0.7052	2466	0.462 (0.242, 0.881)	0.0191
Delivery_concern	2471	0.955 (0.777, 1.173)	0.6582	2729	1.566 (1.308, 1.875)	<.0001	2468	1.520 (1.112, 2.076)	0.0086
Burkha use	3272	0.789 (0.666, 0.935)	0.0061	3591	1.277 (1.111, 1.467)	0.0006	3269	1.066 (0.844, 1.346)	0.5925
<b>Economic status of the household</b>									
Land_area	3159	0.998 (0.997, 0.999)	0.0006	3467	1.000 (0.999, 1.001)	0.7430	3156	0.998 (0.997, 1.000)	0.0378
Possession_pond/ditch	3154	0.788 (0.651, 0.953)	0.0142	3462	0.849 (0.721, 1.000)	0.0495	3151	0.788 (0.605, 1.026)	0.0774
Possession_hh items	3272	0.904 (0.873, 0.936)	<.0001	3591	1.016 (0.986, 1.046)	0.2983	3269	0.950 (0.905, 0.997)	0.0369
Clothes_owned	3272	0.978 (0.966, 0.991)	0.0012	3591	0.999 (0.989, 1.009)	0.8722	3269	0.986 (0.968, 1.004)	0.1212
Shoes_owned	3270	0.806 (0.738, 0.880)	<.0001	3589	0.993 (0.929, 1.062)	0.8477	3267	0.812 (0.717, 0.921)	0.0012
Food insecurity	2983	0.973 (0.949, 0.998)	0.0359	3273	0.999 (0.978, 1.021)	0.9555	2980	0.981 (0.947, 1.017)	0.2973
Balanced hh finance	3264	0.850 (0.695, 1.041)	0.1155	3581	0.786 (0.662, 0.933)	0.0060	3261	0.735 (0.560, 0.965)	0.0264
Stable income	3272	0.768 (0.650, 0.908)	0.0019	3591	0.975 (0.849, 1.120)	0.7200	3269	0.750 (0.593, 0.950)	0.0172

**[Appendix 4-6] Factors associated with persistent consumption of food, micronutrient, and combined supplements among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Program-related factors</b>									
FS acceptability	2018	1.293 (0.986, 1.695)	0.0631	2037	1.068 (0.850, 1.343)	0.5728	2017	1.055 (0.736, 1.511)	0.7723
FS side-effects	2018	1.314 (1.059, 1.630)	0.0131	2037	1.129 (0.937, 1.361)	0.2032	2017	1.412 (1.045, 1.907)	0.0248
MNS information	2616	1.139 (0.771, 1.682)	0.5133	2830	1.252 (0.895, 1.751)	0.1895	2615	0.848 (0.521, 1.382)	0.5086
MNS availability	3136	1.068 (0.851, 1.341)	0.5706	3416	1.856 (1.511, 2.281)	<.0001	3135	1.762 (1.212, 2.561)	0.0030
MNS acceptability	3137	1.092 (0.886, 1.346)	0.4096	3417	1.526 (1.279, 1.822)	<.0001	3136	1.447 (1.102, 1.902)	0.0079
MNS side-effects	3136	1.285 (1.060, 1.557)	0.0106	3416	1.288 (1.097, 1.512)	0.0020	3135	1.342 (1.019, 1.767)	0.0360
Distribution time	1997	0.833 (0.642, 1.080)	0.1679	2016	0.961 (0.769, 1.201)	0.7267	1996	0.773 (0.534, 1.117)	0.1703
Distance to CNC	2014	0.609 (0.496, 0.749)	<.0001	2033	0.930 (0.775, 1.115)	0.4319	2013	0.729 (0.550, 0.966)	0.0275
Waiting time at CNC	1999	0.721 (0.559, 0.930)	0.0118	2016	0.953 (0.770, 1.181)	0.6615	1998	0.718 (0.502, 1.026)	0.0688
Influence of CNP	2016	1.556 (0.881, 2.746)	0.1274	2035	0.858 (0.553, 1.332)	0.4945	2015	0.953 (0.484, 1.875)	0.8887
'Early' FS group	3272	0.099 (0.079, 0.126)	<.0001	3591	1.110 (0.967, 1.273)	0.1383	3269	0.099 (0.068, 0.144)	<.0001
<b>Beliefs</b>									
Sickneeses	2339	1.042 (0.987, 1.100)	0.1406	2554	1.147 (1.096, 1.210)	<.0001	2337	1.095 (1.017, 1.179)	0.0158
Health_problems	3272	1.269 (1.076, 1.497)	0.0048	3591	2.108 (1.831, 2.427)	<.0001	3269	1.615 (1.275, 2.047)	<.0001
Physical weakness	3272	1.196 (1.014, 1.409)	0.0332	3591	1.237 (1.077, 1.421)	0.0026	3269	1.140 (0.905, 1.436)	0.2670
Previous preg experiences	3270	1.363 (1.081, 1.719)	0.0088	3589	1.222 (0.997, 1.499)	0.0536	3267	1.204 (0.869, 1.668)	0.2642
Previous dx experiences	3272	1.056 (0.799, 1.398)	0.7004	3591	0.877 (0.687, 1.118)	0.2894	3269	0.713 (0.458, 1.111)	0.1349
Pre-pregnancy weight	2851	0.990 (0.977, 1.004)	0.1676	3105	1.011 (0.999, 1.022)	0.0686	2849	1.001 (0.983, 1.020)	0.8504
Pre-pregnancy BMI	2847	0.989 (0.955, 1.025)	0.5410	3101	1.027 (0.997, 1.057)	0.0758	2845	1.004 (0.957, 1.054)	0.8195
<b>Attitudes</b>									
MNS positive perceptions	2017	1.425 (1.065, 1.908)	0.0173	2231	2.018 (1.574, 2.587)	<.0001	2015	1.597 (1.041, 2.452)	0.0321
MNS negative perceptions	2017	1.113 (0.816, 1.519)	0.4975	2231	1.038 (0.799, 1.347)	0.7824	2015	1.164 (0.766, 1.769)	0.4767
Pill importance, ill	2726	1.093 (0.897, 1.332)	0.3777	3002	1.238 (1.047, 1.464)	0.0124	2724	1.297 (0.974, 1.727),	0.0755

**[Appendix 4-6] Factors associated with persistent consumption of food, micronutrient, and combined supplements among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Attitudes (cont'd)</b>									
Pill importance, healthy	2602	1.118 (0.774, 1.613)	0.5524	2871	1.343 (0.983, 1.835)	0.0642	2600	1.678 (0.920, 3.059)	0.0913
Days to affect	2434	1.008 (1.001, 1.014)	0.0325	2683	1.007 (1.001, 1.013)	0.0196	2432	1.012 (1.003, 1.021)	0.0079
FS effects, strength	2018	1.864 (1.497, 2.321)	<.0001	2037	1.385 (1.150, 1.667)	0.0006	2017	1.715 (1.266, 2.324)	0.0005
FS effects, health	2018	1.452 (1.182, 1.784)	0.0004	2037	1.172 (0.977, 1.506)	0.0868	2017	1.168 (0.882, 1.548)	0.2784
FS effects, weight	2018	1.854 (1.428, 2.407)	<.0001	2037	1.133 (0.920, 1.394)	0.2408	2017	1.719 (1.192, 2.478)	0.0037
MNS effects, appetite	3136	1.367 (1.111, 1.681)	0.0031	3416	1.947 (1.628, 2.328)	<.0001	3135	1.973 (1.418, 2.744)	<.0001
MNS effects, strength	3136	1.262 (1.047, 1.521)	0.0145	3416	1.793 (1.527, 2.105)	<.0001	3135	1.697 (1.280, 2.252)	0.0002
MNS effects, positive	3135	1.438 (1.126, 1.836)	0.0036	3415	2.042 (1.654, 2.521)	<.0001	3134	2.069 (1.386, 3.088)	0.0004
Increase_Hb conc.	3271	0.971 (0.818, 1.152)	0.7362	3589	0.917 (0.793, 1.060)	0.2421	3268	0.768 (0.599, 0.984)	0.0371
Weight gains	3272	1.662 (1.141, 2.420)	0.0081	3591	1.940 (1.432, 2.629)	<.0001	3269	2.094 (1.128, 3.888)	0.0192
<b>Social influences</b>									
Living with mother-in-law	3271	0.886 (0.737, 1.064)	0.1955	3590	0.883 (0.757, 1.031)	0.1164	3268	0.950 (0.732, 1.231)	0.6961
Living with in-laws	3271	1.004 (0.793, 1.270)	0.9767	3590	0.868 (0.717, 1.051)	0.1479	3268	0.836 (0.610, 1.146)	0.2649
Controlling behaviors	3147	0.860 (0.722, 1.023)	0.0891	3450	0.881 (0.762, 1.019)	0.0871	3145	0.851 (0.666, 1.088)	0.1976
Physical violence_life	3147	1.241 (1.021, 1.508)	0.0297	3450	1.043 (0.881, 1.234)	0.6265	3145	1.050 (0.796, 1.384)	0.7299
Physical violence_preg	3147	0.918 (0.666, 1.265)	0.6002	3450	0.806 (0.613, 1.059)	0.1214	3145	0.892 (0.565, 1.408)	0.6234
Emotional violence_life	3147	0.827 (0.683, 1.000)	0.0504	3450	1.055 (0.903, 1.233)	0.4992	3145	0.894 (0.686, 1.165)	0.4072
Emotional violence_preg	3147	0.682 (0.533, 0.874)	0.0025	3450	0.984 (0.812, 1.191)	0.8656	3145	0.822 (0.586, 1.151)	0.2540
Sexual violence_life	3147	1.011 (0.834, 1.227)	0.9093	3450	0.958 (0.814, 1.128)	0.6088	3145	0.856 (0.648, 1.132)	0.2749
Sexual violence_preg	3147	0.811 (0.626, 1.051)	0.1136	3450	0.805 (0.650, 0.997)	0.0473	3145	0.791 (0.545, 1.149)	0.2187
Workload	2498	0.858 (0.706, 1.044)	0.1266	2739	0.943 (0.800, 1.111)	0.4800	2497	0.861 (0.657, 1.130)	0.2811
Rest	2498	1.155 (0.956, 1.394)	0.1355	2739	0.969 (0.828, 1.134)	0.6954	2497	1.158 (0.892, 1.503)	0.2719



**[Appendix 4-6] Factors associated with persistent consumption of food, micronutrient, and combined supplements among MINIMat participants (cont'd)**

Factors	Food			Micronutrient			Combined		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Social influences (cont'd)</b>									
Influence of husband	2012	1.276 (1.029, 1.582)	0.0266	2031	0.935 (0.777, 1.127)	0.4816	2011	1.198 (0.892, 1.608)	0.2295
Influence of mother-in-law	1870	0.963 (0.774, 1.197)	0.7316	1888	1.039 (0.858, 1.258)	0.6959	1869	1.113 (0.826, 1.498)	0.4817
Influence of father-in-law	1584	1.168 (0.898, 1.518)	0.2467	1600	1.203 (0.953, 1.519)	0.1197	1583	1.298 (0.916, 1.840)	0.1420
Influence of sister-in-law	1904	1.061 (0.858, 1.311)	0.5869	1922	0.943 (0.782, 1.137)	0.5375	1903	1.233 (0.920, 1.652)	0.1608
Influence of others	2005	1.209 (0.971, 1.505)	0.0902	2024	0.751 (0.621, 0.907)	0.0029	2004	1.111 (0.824, 1.498)	0.4897
<b>Autonomy</b>									
Mobility	2196	1.109 (1.029, 1.195)	0.0065	2428	1.057 (0.994, 1.124)	0.0773	2193	1.149 (1.036, 1.273)	0.0086
Permission	2184	0.874 (0.810, 0.944)	0.0006	2415	1.070 (1.007, 1.138)	0.0295	2181	0.938 (0.845, 1.042)	0.2333
Control over finance	2156	1.133 (1.033, 1.244)	0.0084	2386	1.073 (0.991, 1.162)	0.0813	2153	1.053 (0.924, 1.200)	0.4366
Purchase	1831	1.066 (1.021, 1.113)	0.0038	2017	1.034 (0.997, 1.072)	0.0728	1829	1.048 (0.989, 1.111)	0.1146
Decision_making	2199	1.130 (1.076, 1.188)	<.0001	2431	0.995 (0.956, 1.036)	0.7973	2196	1.106 (1.033, 1.184)	0.0037
NGO membership	2199	1.511 (1.223, 1.865)	0.0001	2431	0.971 (0.809, 1.166)	0.7529	2196	1.009 (0.747, 1.363)	0.9525
Earned income	3272	2.036 (1.561, 2.654)	<.0001	3591	1.130 (0.878, 1.453)	0.3425	3269	1.998 (1.420, 2.813)	<.0001
<b>Variables controlled</b>									
GA at enrollment	3272	0.944 (0.908, 0.981)	0.0036	3591	0.916 (0.887, 0.946)	<.0001	3269	0.913 (0.863, 0.965)	0.0013
Season at enrollment	3272	1.261 (1.054, 1.508)	0.0112	3591	0.921 (0.789, 1.075)	0.2984	3269	0.851 (0.662, 1.094)	0.2087

**[Appendix 4-7] Factors associated with sharing food packages with others and replacing home meals with food supplements among MINIMat participants**

Factors	Sharing			Replacement		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Demographic characteristics</b>						
Maternal age	3271	1.051 (1.036, 1.065)	<.0001	3268	0.996 (0.984, 1.008)	0.4700
Parity	3269	1.348 (1.261, 1.441)	<.0001	3266	0.967 (0.918, 1.018)	0.2000
Years of education	3272	0.969 (0.950, 0.988)	0.0012	3269	0.978 (0.961, 0.995)	0.0109
<b>Cultural perceptions and practices</b>						
Delivery_fear	2471	0.729 (0.520, 1.023)	0.0676	2468	1.044 (0.789, 1.382)	0.7633
Size_concern	2471	1.335 (1.100, 1.606)	0.0022	2468	0.832 (0.705, 0.974)	0.0228
Baby_size	2471	1.017 (0.644, 1.605)	0.9426	2468	1.058 (0.707, 1.585)	0.7828
Intake_amount	2470	1.042 (0.869, 1.250)	0.6544	2467	0.928 (0.790, 1.089)	0.3602
Fear_evilspirit	2471	0.789 (0.657, 0.948)	0.0112	2468	0.773 (0.656, 0.911)	0.0021
Ration_discomfort	2470	1.107 (0.903, 1.358)	0.3277	2467	0.856 (0.714, 1.026)	0.0934
Outside_discomfort	2469	1.765 (1.045, 2.982)	0.0337	2466	0.458 (0.271, 0.772)	0.0034
Delivery_concern	2471	0.881 (0.722, 1.075)	0.2116	2468	0.948 (0.797, 1.128)	0.5486
<i>Burkha</i> use	3272	0.936 (0.798, 1.098)	0.4175	3269	0.747 (0.647, 0.864)	<.0001
<b>Economic status of the household</b>						
Land_area	3159	1.000 (0.999, 1.000)	0.2913	3156	1.000 (0.999, 1.001)	0.8073
Possession_pond/ditch	3154	1.050 (0.871, 1.265)	0.6118	3151	0.693 (0.587, 0.820)	<.0001
Possession_hh items	3272	0.961 (0.929, 0.994)	0.0212	3269	0.992 (0.962, 1.022)	0.5929
Clothes_owned	3272	0.990 (0.979, 1.001)	0.0658	3269	1.002 (0.992, 1.012)	0.7108
Shoes_owned	3270	0.937 (0.869, 1.010)	0.0897	3267	0.980 (0.915, 1.050)	0.5985
Food insecurity	2983	0.970 (0.946, 0.995)	0.0167	2980	1.007 (0.986, 1.030)	0.5042
Balanced hh finance	3264	0.964 (0.790, 1.176)	0.7170	3261	0.883 (0.740, 1.053)	0.1656
Stable income	3272	0.899 (0.768, 1.052)	0.1832	3269	0.962 (0.835, 1.108)	0.5903

**[Appendix 4-7] Factors associated with sharing food packages with others and replacing home meals with food supplements among MINIMat participants (cont'd)**

Factors	Sharing			Replacement		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Program-related factors</b>						
FS acceptability	2018	0.873 (0.673, 1.132)	0.3054	2017	0.980 (0.785, 1.223)	0.8578
FS side-effects	2018	0.984 (0.796, 1.207)	0.8520	2017	1.073 (0.895, 1.286)	0.4448
MNS information	2616	0.533 (0.339, 0.839)	0.0066	2615	0.963 (0.690, 1.346)	0.8262
MNS availability	3136	1.032 (0.830, 1.283)	0.7760	3135	0.957 (0.789, 1.162)	0.6600
MNS acceptability	3137	0.792 (0.648, 0.969)	0.0232	3136	1.038 (0.864, 1.248)	0.6901
MNS side-effects	3136	1.075 (0.898, 1.287)	0.4316	3135	0.778 (0.663, 0.912)	0.0020
Distribution time	1997	1.330 (1.023, 1.728)	0.0329	1996	0.979 (0.788, 1.216)	0.8480
Distance to CNC	2014	1.044 (0.853, 1.279)	0.6759	2013	0.977 (0.819, 1.165)	0.7954
Waiting time at CNC	1999	1.042 (0.821, 1.324)	0.7335	1998	0.842 (0.684, 1.037)	0.1057
Influence of CNP	2016	0.980 (0.592, 1.620)	0.9360	2015	0.616 (0.398, 0.954)	0.0314
'Early' FS group	3272	0.915 (0.783, 1.070)	0.2675	3269	0.842 (0.732, 0.970)	0.0169
<b>Beliefs</b>						
Sickneeses	2339	1.075 (1.017, 1.136)	0.0103	2337	1.088 (1.039, 1.140)	0.0004
Health_problems	3272	1.571 (1.339, 1.844)	<.0001	3269	1.479 (1.283, 1.704)	<.0001
Physical weakness	3272	1.568 (1.332, 1.844)	<.0001	3269	1.575 (1.366, 1.815)	<.0001
Previous preg experiences	3270	1.095 (0.862, 1.391)	0.4572	3267	1.200 (0.975, 1.479)	0.0858
Previous dx experiences	3272	1.026 (0.779, 1.350)	0.8566	3269	1.063 (0.834, 1.355)	0.6199
Pre-pregnancy weight	2851	1.004 (0.990, 1.017)	0.5773	2849	0.989 (0.977, 1.001)	0.0687
Pre-pregnancy BMI	2847	1.011 (0.977, 1.047)	0.5237	2845	0.991 (0.961, 1.022)	0.5574
<b>Attitudes</b>						
MNS positive perceptions	2017	1.806 (1.417, 2.303)	<.0001	2015	1.013 (0.805, 1.275)	0.9097
MNS negative perceptions	2017	1.474 (1.060, 2.051)	0.0212	2015	0.528 (0.398, 0.702)	<.0001
Pill importance, ill	2726	0.990 (0.820, 1.196)	0.9173	2724	1.121 (0.948, 1.325)	0.1811

**[Appendix 4-7] Factors associated with sharing food packages with others and replacing home meals with food supplements among MINIMat participants (cont'd)**

Factors	Sharing			Replacement		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Attitudes (cont'd)</b>						
Pill importance, healthy	2602	1.138 (0.813, 1.593)	0.4510	2600	1.196 (0.865, 1.602)	0.3004
Days to affect	2434	1.003 (0.996, 1.010)	0.3947	2432	0.993 (0.987, 0.999)	0.0316
FS effects, strength	2018	0.776 (0.630, 0.956)	0.0172	2017	1.113 (0.930, 1.331)	0.2424
FS effects, health	2018	0.811 (0.662, 0.993)	0.0430	2017	1.406 (1.178, 1.679)	0.0002
FS effects, weight	2018	0.726 (0.570, 0.926)	0.0098	2017	1.153 (0.942, 1.412)	0.1685
MNS effects, appetite	3136	0.852 (0.700, 1.037)	0.1098	3135	1.241 (1.045, 1.475)	0.0141
MNS effects, strength	3136	0.850 (0.710, 1.018)	0.0772	3135	1.175 (1.003, 1.376)	0.0457
MNS effects, positive	3135	0.847 (0.675, 1.064)	0.1537	3134	1.754 (1.425, 2.159)	<.0001
Increase_Hb conc.	3271	0.946 (0.803, 1.114)	0.5030	3268	1.006 (0.869, 1.166)	0.9325
Weight gains	3272	1.479 (1.108, 1.976)	0.0080	3269	1.217 (0.914, 1.621)	0.1793
<b>Social influences</b>						
Living with mother-in-law	3271	0.912 (0.761, 1.093)	0.3191	3268	0.913 (0.779, 1.071)	0.2660
Living with in-laws	3271	1.261 (1.015, 1.566)	0.0365	3268	1.104 (0.901, 1.353)	0.3381
Controlling behaviors	3147	1.168 (0.988, 1.382)	0.0697	3145	0.883 (0.760, 1.024)	0.0987
Physical violence_life	3147	1.566 (1.272, 1.928)	<.0001	3145	0.802 (0.672, 0.955)	0.0134
Physical violence_preg	3147	1.291 (0.936, 1.780)	0.1194	3145	0.904 (0.687, 1.189)	0.4713
Emotional violence_life	3147	1.651 (1.361, 2.002)	<.0001	3145	0.858 (0.730, 1.009)	0.0642
Emotional violence_preg	3147	1.571 (1.235, 2.000)	0.0002	3145	0.907 (0.743, 1.106)	0.3327
Sexual violence_life	3147	1.296 (1.068, 1.572)	0.0086	3145	0.680 (0.573, 0.807)	<.0001
Sexual violence_preg	3147	1.335 (1.036, 1.720)	0.0253	3145	0.808 (0.650, 1.004)	0.0542
Workload	2498	1.159 (0.960, 1.398)	0.1242	2497	1.158 (0.981, 1.368)	0.0839
Rest	2498	0.795 (0.663, 0.955)	0.0140	2497	1.048 (0.893, 1.230)	0.5649

**[Appendix 4-7] Factors associated with sharing food packages with others and replacing home meals with food supplements among MINIMat participants (cont'd)**

Factors	Sharing			Replacement		
	N	Odds ratio (95% CI)	p-value	N	Odds ratio (95% CI)	p-value
<b>Social influences (cont'd)</b>						
Influence of husband	2012	0.868 (0.703, 1.072)	0.1891	2011	1.051 (0.877, 1.260)	0.5897
Influence of mother-in-law	1870	0.835 (0.674, 1.035)	0.0994	1869	0.960 (0.798, 1.156)	0.6689
Influence of father-in-law	1584	0.794 (0.616, 1.024)	0.0758	1583	0.817 (0.651, 1.027)	0.0832
Influence of sister-in-law	1904	0.970 (0.787, 1.196)	0.7769	1903	0.725 (0.604, 0.869)	0.0005
Influence of others	2005	0.940 (0.759, 1.164)	0.5714	2004	0.757 (0.629, 0.911)	0.0032
<b>Autonomy</b>						
Mobility	2196	1.159 (1.078, 1.245)	<.0001	2193	1.031 (0.968, 1.098)	0.3449
Permission	2184	1.005 (0.937, 1.078)	0.8878	2181	1.047 (0.984, 1.114)	0.1472
Control over finance	2156	1.249 (1.136, 1.374)	<.0001	2153	0.865 (0.797, 0.938)	0.0005
Purchase	1831	1.069 (1.023, 1.117)	0.0028	1829	0.976 (0.940, 1.013)	0.1980
Decision_making	2199	1.111 (1.061, 1.164)	<.0001	2196	0.993 (0.953, 1.034)	0.7375
NGO membership	2199	1.286 (1.038, 1.594)	0.0212	2196	1.164 (0.969, 1.399)	0.1051
Earned income	3272	1.115 (0.831, 1.498)	0.4675	3269	1.029 (0.797, 1.329)	0.8263
<b>Variables controlled</b>						
GA at enrollment	3272	0.955 (0.921, 0.990)	0.0112	3269	0.926 (0.896, 0.957)	<.0001
Season at enrollment	3272	0.931 (0.780, 1.113)	0.4419	3269	1.149 (0.980, 1.346)	0.0875

## [Appendix 4-8] SAS commands used for conducting multiple logistic regressions for model selections by employing multiple imputations for missing values in explanatory variables – examples of full models.

### A. Initiation

#### a. Food Supplementation

```
proc mi data=minimat2.backgr_2_exp_fsini2 nimpute=10
out=minimat2.fsinitiation2_imp seed=156124;
mcmc initial=em;
var initiation_gr age_enroll parity edu_t dc12gr dc14gr dc16gr dc20gr
dc17gr dc13gr dc19gr burkha3 land_own hh_possess2 en41 clothes
stable_income hh_income ppwt feel_weak_e days_effect_p2
familycomp_inlaw familycomp_mil dc3016sl_gr ngo_part handle_2
permission purchase2 visits_2 decision_auto3 work_income
enr_season7 foodgr ga_enroll ;
run;
/***** Full model *****/
proc logistic data=minimat2.fsinitiation2_imp
outest=minimat2.outfsinitiation covout descending;
by _imputation_;
model initiation_gr= age_enroll parity edu_t dc12gr dc13gr dc17gr
dc19gr burkha3 land_own en41 clothes
ppwt familycomp_inlaw ngo_part handle_2 work_income enr_season7 foodgr
ga_enroll/rsq; run;

proc mianalyze data=minimat2.outfsinitiation edf=3763;
modeleffects age_enroll parity edu_t dc12gr dc13gr dc17gr dc19gr
burkha3 land_own en41 clothes ppwt familycomp_inlaw ngo_part handle_2
work_income enr_season7 foodgr ga_enroll; run;
```

#### b. Combined Supplementation

```
proc mi data=minimat2.backgr_2_exp_mnsini2 nimpute=10
out=minimat2.fsmnsinitiation2_imp seed=156124;
mcmc initial=em;
var fsmns_ini age_enroll parity dc12gr dc14gr dc16gr dc20gr dc17gr
dc13gr dc19gr burkha3 land_own hh_possess2 en41 clothes ppwt ngo_part
familycomp_inlaw familycomp_mil dc3016sl_gr handle_2 permission
purchase2 visits_2 decision_auto3 enr_season7 foodgr ga_enroll;
run;
/***** Full model *****/
proc logistic data=minimat2.fsmnsinitiation2_imp
outest=minimat2.outfsmnsinitiation2_3 covout noprint descending;
by _imputation_;
model fsmns_ini= edu_t dc12gr dc17gr dc19gr burkha3 land_own en41
clothes hh_possess2 stable_income ppwt days_effect_p2 familycomp_inlaw
ngo_part handle_2 enr_season7 foodgr ga_enroll/rsq; run;

proc mianalyze data=minimat2.outfsmnsinitiation2_3 edf=3710;
modeleffects edu_t dc12gr dc17gr dc19gr burkha3 land_own en41 clothes
hh_possess2 stable_income ppwt days_effect_p2 familycomp_inlaw
ngo_part handle_2 enr_season7 foodgr ga_enroll; run;
```

## B. Pattern

### a. Food Supplementation

```
proc mi data=minimat2.backgr_2_exp_fsutil nimpute=10
out=minimat2.utilmultifs2_imp seed=156124;
mcmc initial=em;
var fsave_pattern age_enroll parity meanfsss fs_strength fs_health
fs_weight mns_app1830_gr mns_str1830_gr mns_pos_eff1830 ngo_part
decision_auto3 handle_2 purchase2 visits_2 work_income edu_t ration_gr
outside_gr hh_income stable_income land_own hh_possess2 en41 clothes
dc3017_gr dc3018_gr dc3019_gr permission enr_season7 foodgr2 ga_enroll;
run;
/***** Full Model *****/
proc logistic data=minimat2.utilmultifs2_imp
outest=minimat2.oututilmultifs2_1 covout noprint descending;
by _imputation_;
model fsave_pattern= age_enroll parity fs_strength mns_app1830_gr
ngo_part work_income edu_t ration_gr land_own en41 clothes hh_possess2
decision_auto3 dc3018_gr enr_season7 foodgr ga_enroll; run;
proc mianalyze data=minimat2.oututilmultifs2_1 edf=3255;
modeleffects age_enroll parity fs_strength mns_app1830_gr ngo_part
work_income edu_t ration_gr land_own en41 clothes hh_possess2
decision_auto3 dc3018_gr enr_season7 foodgr ga_enroll;
run;
```

### b. Micronutrient Supplementation

```
proc mi data=minimat2.backgr_2_exp_mnsutil nimpute=10
out=minimat2.utilmultimns2_imp seed=156124;
mcmc initial=em;
var mnsave_pattern age_enroll parity edu_t delivery_concern_gr
deliveryfear_gr burkha3 mns_accept1830_gr mns_avail1830
mns_available18 sick_all_gr health_problem_gr feel_weak_gr2
mns_positive08 pill_health_imp days_effect_m2 mns_app1830_gr
mns_str1830_gr mns_pos_eff1830 wtgainall_gr2 enr_season7 foodgr
ga_enroll fs_weight mns_gr1 mns_gr2;
run;
/***** Full Model *****/
proc logistic data=minimat2.utilmultimns2_imp
outest=minimat2.oututilmultimns2_1 covout noprint descending;
by _imputation_;
model mnsave_pattern= age_enroll delivery_concern_gr mns_accept1830_gr
mns_avail1830 sick_all_gr mns_positive08 mns_app1830_gr wtgainall_gr2
enr_season7 mns_gr1 mns_gr2 foodgr ga_enroll; run;
proc mianalyze data=minimat2.oututilmultimns2_1 edf=3578;
modeleffects age_enroll delivery_concern_gr mns_accept1830_gr
mns_avail1830 sick_all_gr mns_positive08 mns_app1830_gr wtgainall_gr2
enr_season7 mns_gr1 mns_gr2 foodgr ga_enroll;
run;
```

### c. Combined Supplementation

```
proc mi data=minimat2.backgr_2_exp_fsmnsutil nimpute=10
out=minimat2.utilmultifsmns2_imp seed=156124;
mcmc initial=em;
var fsmnsave_pattern age_enroll parity delivery_concern_gr
deliveryfear_gr meanfsss mns_positive08 fs_strength fs_health fs_weight
```

```

mns_app1830_gr mns_str1830_gr mns_pos_eff1830 wtgainall_gr2 purchase2
decision_auto3 visits_2 permission handle_2 work_income edu_t ration_gr
outside_gr enr_season7 foodgr2 mns_gr1 mns_gr2 ga_enroll;
run;
/***** Full Model *****/
proc logistic data=minimat2.utilmultifsmns2_imp
outest=minimat2.oututilmultifsmns2_1 covout descending;
by _imputation_;
model fsmnsave_pattern= age_enroll fs_strength mns_app1830_gr
decision_auto3 work_income edu_t ration_gr foodgr2 /rsq; run;
proc mianalyze data=minimat2.oututilmultifsmns2_1 edf=3245;
modeleffects age_enroll fs_strength mns_app1830_gr decision_auto3
work_income edu_t ration_gr foodgr2 ;
run;

```

## C. Persistent consumers

### a. Food Supplementation

```

proc mi data=minimat2.backgr_2_exp_fsutil nimpute=10
out=minimat2.supermultifs2_imp seed=156124;
mcmc initial=em;
var fs_super age_enroll parity edu_t foodgr2 ration_gr outside_gr
burkha3 deliveryfear_gr fs_strength fs_health fs_weight emolife_2
phylife_2 sexlife_2 conbeh_2 ppwt ppbmi ngo_part handle_2 purchase2
decision_auto3 visits_2 work_income permission hh_possess2 en41 clothes
land_own land2 dc3017_gr dc3018_gr dc3019_gr hh_income stable_income
enr_season7 ga_enroll asset_f;
run;
/***** Full Model *****/
proc logistic data=minimat2.supermultifs2_imp
outest=minimat2.outsupermultifs2_1 covout noprint descending;
by _imputation_;
model fs_super= age_enroll fs_strength ngo_part work_income edu_t
ration_gr hh_income hh_possess2 land_own en41 dc3018_gr permission
decision_auto3 enr_season7 foodgr ga_enroll; run;
proc mianalyze data=minimat2.outsupermultifs2_1 edf=3240;
modeleffects age_enroll fs_strength ngo_part work_income edu_t
ration_gr hh_income hh_possess2 land_own en41 dc3018_gr permission
decision_auto3 enr_season7 foodgr ga_enroll;
run;

```

### b. Micronutrient Supplementation

```

proc mi data=minimat2.backgr_2_exp_mnsutil nimpute=10
out=minimat2.supermultimns2_imp seed=156124;
mcmc initial=em;
var mns_super age_enroll parity delivery_concern_gr burkha3 ration_gr
sizeconcern_gr outside_gr mns_avail1830 mns_accept1830_gr
mns_available18 sick_all_gr feel_weak_gr2 health_problem_gr
mns_positive08 pill_ill_imp mns_negative08 fs_strength fs_health
fs_weight mns_app1830_gr mns_str1830_gr mns_pos_eff1830 wtgainall_gr2
hh_possess2 land_own land2 hh_income stable_income en41 clothes
permission visits_2 purchase2 handle_2 decision_auto3 work_income
dc3016fl_gr dc3016ml_gr dc3016hu_gr enr_season7 foodgr ga_enroll
mns_gr1 mns_gr2 asset_f;
run;
/***** Full Model*****/

```



```

proc logistic data=minimat2.supermultimns2_imp
outest=minimat2.outsupermultimns2_1 covout noprint descending;
by _imputation_;
model mns_super= age_enroll delivery_concern_gr burkha3 mns_avail1830
mns_accept1830_gr sick_all_gr health_problem_gr mns_positive08
fs_strength mns_app1830_gr wtgainall_gr2 enr_season7 foodgr ga_enroll
mns_gr1 mns_gr2; run;
proc mianalyze data=minimat2.outsupermultimns2_1 edf=3575;
modeleffects age_enroll delivery_concern_gr burkha3 mns_avail1830
mns_accept1830_gr sick_all_gr health_problem_gr mns_positive08
fs_strength mns_app1830_gr wtgainall_gr2 enr_season7 foodgr ga_enroll
mns_gr1 mns_gr2;
run;

```

### c. Combined Supplement

```

proc mi data=minimat2.backgr_2_exp_fsmnsutil nimpute=10
out=minimat2.supermultifsmns2_imp seed=156124;
mcmc initial=em;
var fsmns_super age_enroll parity edu_t delivery_concern_gr
deliveryfear_gr ration_gr outside_gr alga_gr burkha3 sick_all_gr
health_problem_gr feel_weak_gr2 mns_positive08 fs_strength fs_health
fs_weight mns_app1830_gr mns_str1830_gr mns_pos_eff1830 visits_2
decision_auto3 work_income permission handle_2 purchase2 dc3016fl_gr
dc3016hu_gr dc3016ml_gr dc3016sl_gr enr_season7 foodgr2 ga_enroll
mns_gr1 mns_gr2 asset_f;
run;
/***** Full Model *****/
proc logistic data=minimat2.supermultifsmns2_imp
outest=minimat2.outsupermultifsmns2_1 covout noprint descending;
by _imputation_;
model fsmns_super= age_enroll health_problem_gr fs_strength
mns_app1830_gr work_income edu_t ration_gr enr_season7 foodgr
ga_enroll mns_gr1 mns_gr2/rsq; run;
proc mianalyze data=minimat2.outsupermultifsmns2_1 edf=3257;
modeleffects age_enroll health_problem_gr fs_strength mns_app1830_gr
work_income edu_t ration_gr enr_season7 foodgr ga_enroll mns_gr1
mns_gr2;
run;

```

## **[Appendix 4-9] Model selection process performed in this study**

### **A. For binary outcomes (Initiation, pattern, and persistent consumption)**

- Step 1** Multiple imputations were conducted and ten imputed datasets were created by using ‘proc mi’ with Markov chain Monte Carlo (MCMC) method and the expectation-maximization (EM) algorithm for explanatory variables that were significantly associated with each outcome variable in the adjusted analysis but with missing values
- Step 2** For each imputed dataset, logistic regressions of full model that included all explanatory variables significantly associated with were performed. For those variables that were significantly correlated with, for example age and parity, separate full models were analyzed by putting one variable at a time. Then by using ‘proc mianalyze’, parameter estimates were determined for each full model
- Step3** Logistic regressions of reduced models were performed by including only variables of which parameter estimate was statistically significant and its magnitude was large enough to consider from the full model analysis. For those variables in the same domain of the theoretical model (Figure 5-3), reduced model analysis was done by switching them with other variables held constant.
- Step4** Results of all reduced model analysis were compared and the best model was selected by considering and statistical significance and magnitude of the parameter estimate and goodness of fit (Max-rescaled  $R^2$ ) of each model.

### **B. For continuous outcomes (Duration and intensity)**

- Step 1** Full model analysis was conducted by including all explanatory variables significantly associated with each outcome in the adjusted analysis. To use full information maximum likelihood, ‘proc calis’ was used. For those variables that were significantly correlated with, for example age and parity, separate full models were analyzed by putting one variable at a time.
- Step 2** Reduced model analysis was performed by only including variables of which parameter estimates were statistically significant and its magnitude was large enough to consider from the full model analysis. For those variables in the same domain of the theoretical model (Figure 5-3), reduced model analysis was done by switching these variables with

other variables held constant.

**Step3** Results of all reduced model analysis were compared and the best model was selected by considering and statistical significance and magnitude of the parameter estimate and goodness of fit (Akaike information criterion, AIC) of each model.

#### **[Appendix 4-10] List of MINIMat datasets used for this study**

The following list includes the name of datasets used for this study provided by the MINIMat research group upon receiving research proposal submitted by the principal investigator. All datasets were downloaded from [www.minimat.org](http://www.minimat.org), that is not available now and dataset are not open to public either.

(List of datasets)

- ANC clinical examinations
- Background characteristics
- Bacterial Vaginosis enrollment (clinical information)
- Determinants of compliance
- Dietary assessment
- Eligibility criteria and randomization
- Food frequency
- Food supplement consumption recall
- Final deposition
- Maternal anthropometry
- Maternal Violence
- MNS pill intake
- MNS compliance
- Morbidity during pregnancy
- Nutrition biomarkers in pregnancy
- Workload

## REFERENCES

1. Black RE, Allen LH, Bhutta ZA, et al. Maternal and child undernutrition: Global and regional exposures and health consequences. *Lancet*. 2008;371(9608):243-260.
2. Bhutta ZB, Ahmed T, Black RE, et al. What works? interventions for maternal and child undernutrition and survival. *Lancet*. 2008;371(9610):417-440.
3. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition interventions. *The Asian Development Bank Nutrition and Development Series*. 2001.
4. Gillespie SR. Supplementary feeding for women and young children. . 1999;Nutrition Toolkit Module No. 5.
5. Scholl TO, Reilly T. Anemia, iron and pregnancy outcome. *Journal of Nutrition*. 2000;130:443S-447S.
6. Aikawa R, Jimba M, Nguyen KC, Zhao Y, Binns CW, Lee MK. Why do adult women in vietnam take iron tablets? *BMC Public Health*. 2006;6:144.
7. Prentice AM. Can maternal dietary supplements help in preventing infant malnutrition? *Acta Paediatr Scand Suppl*. 1991;374:67-77.
8. Schultink W, Gross R. Iron deficiency alleviation in developing countries. *Nutrition Research Reviews*. 1996;9:281-293.

9. Yip R. Iron supplementation: Country level experiences and lessons learned. *Journal of Nutrition*. 2002.;132:859S-861S.
10. Chanarmn I, Rothman D. Further observations on the relation between iron and folate status in pregnancy. *Br Med J*. 1971;2:81-84.
11. Charoenlarp P, Dhanamitta S, Kaewvichit R, et al. A WHO collaborative study on iron supplementation in burma and in thailand. *Am J Clin Nutr*. 1988;47:280-297.
12. Chisholm M. A controlled clinical trial of prophylactic folic acid and iron in pregnancy. *J Obstet Gynaecol Br Commonw*. 1966;73:191-196.
13. Kuizon MD, Desnacido JA, Platon TP, Ancheta LP, Macapinlac MP. Iron supplementation using different dose levels in pregnant filipinos. *Nutrition Research*. 1983;3:257-264.
14. Latham MC, Ash DM, Makola D, Tatala SR, Ndossi GD, Mehansho H. Efficacy trials of a micronutrient dietary supplement in schoolchildren and pregnant women in tanzania. *Food and Nutrition Bulletin*. 2003;24(4(supplement)):S120-S128.
15. Menendez C, Todd J, Alonso P, et al. The effects of iron supplementation during pregnancy, given by traditional birth attendants, on the prevalence of anaemia and malaria. *Trans R Soc Trop Med Hyg*. 1994;88:590-593.
16. Simmons WK, Cook JD, Bingham KC, et al. Evaluation of a gastric delivery system for iron supplementation in pregnancy. *Am J Clin*. 1993;58:622-626.

17. Seck BC, Jackson RT. Determinants of compliance with iron supplementation among pregnant women in senegal. *Public Health Nutrition*. 2007;11(6):596-605.
18. Khan MM, Ahmed S, Protik AE, Dhar BC, Roy SK. Effects of a food supplementation program on the nutritional status of pregnant women in bangladesh. *Food and Nutrition Bulletin*. 2005;26(4):330-337.
19. Kramer MS, Kakuma R. Energy and protein intake in pregnancy. *Cochrane Database of Systematic Reviews*. 2003;4:CD000032.
20. Jasti S, Siega-Riz AM, Cogswell ME, Hartzema AG, Bentley ME. Pill count adherence to prenatal multivitamin/mineral supplement use among low-income women. *The Journal of Nutrition*. 2005;135:1093-1101.
21. Ekstrom EM, Kavishe FP, Habicht JP, Frongillo Jr EA, Rasmussen KM, Hemed L. Adherence to iron supplementation during pregnancy in tanzania: Determinants and hematologic consequences. *The American Journal of Clinical Nutrition*. 1996;64:368-374.
22. Beard JL. Effectiveness and strategies of iron supplementation during pregnancy. *Am J Clin Nutr*. 2000;71(supple):1288s-1294s.
23. Conlin ML, MacLennan AH, Broadbent JL. Inadequate compliance with periconceptional folic acid supplementation in south australia. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2006;46:528-533.

24. Nyazema NZ. Towards better patient drug compliance and comprehension: A challenge to medical and pharmaceutical services in zimbabwe. *Soc Sci Med*. 1984;18(7):551-554.
25. Schultink W, van der Ree M, Matulessi P, Gross R. Low compliance with an iron-supplementation program: A study among pregnant women in jakarta, Indonesia. *The American Journal of Clinical Nutrition*. 1993;57:135-139.
26. Yip R. Iron supplementation during pregnancy: Is it effective? *The American Journal of Clinical Nutrition*. 1996;63(6):853-855.
27. Wayner CJ, Heinke ML. Compliance: Crafting quality care. *Vet Clin Small Anim*. 2006;36:419-436.
28. Kehoe SH, Chheda PS, Sahariah SA, Barid J, Fall CHD. Reporting of participant compliance in randomized controlled trials of nutrition supplements during pregnancy. *Maternal and Child Nutrition*. 2009;5:97-103.
29. Gupta P, Ray M, Dua T, Radhakrishnan G, Kumar R, Sachdev HPS. Multimicronutrient supplementation for undernourished pregnant women and the birth size of their offspring. *Arch Pediatr Adolesc Med*. 2007;161:58-64.
30. Kæstel P, Michaelsen KF, Aaby P, Friis H. Effects of prenatal multimicronutrient supplements on birth weight and perinatal mortality: A randomised, controlled trial in guinea-bissau. *European Journal of Clinical Nutrition*. 2005;59:1081-1089.



31. Kardjati S, Kusin JA, de With C. Energy supplementation in the last trimester of pregnancy in east java: I. effect on birthweight. *British Journal of Obstetrics and Gynaecology*. 1988;95:783-794.
32. Moriarty-Craige SE, Ramakrishnan U, Neufeld L, Rivera J, Martorell R. Multivitamin-mineral supplementation is not as efficacious as is iron supplementation in improving hemoglobin concentrations in nonpregnant anemic women living in mexico. *Am J Clin Nutr*. 2004;80:1308-1311.
33. Christian P, Shrestha J, LeClerq SC, et al. Supplementation with micronutrients in addition to iron and folic acid does not further improve the hematologic status of pregnant women in rural nepal. *J Nutr*. 2003;133(3492):3498.
34. Wulff M, EKSTROM E. Iron supplementation during pregnancy in sweden: To what extent is the national recommendation followed? *Acta Obstet Gynecol Scand*. 2003;82:628-635.
35. Nordeng H, Eskild A, Nesheim B-, Aursnes I, Jacobsen G. Guidelines for iron supplementation in pregnancy: Compliance among 431 parous scandinavian women. *Eur J Clin Pharmacol*. 2003;59:163-168.
36. Knudsen VK, Hansen HS, Ovesen L, Mikkelsen TB, Olsen SF. Iron supplement use among danish pregnant women. *Public Health Nutrition*. 2007;10(10):1104-1110.
37. Bondarianzadeh D, Siassi F, Omidvar N, Golestan B, Keighobadi K. Low compliance with the iron supplementation program among pregnant women in the rural areas of kerman district, I.R. iron. *Nutrition Research*. 1998;18(6):945-952.

38. Bloom SS, Wypij D, Gupta MD. Dimensions of women's autonomy and the influence on maternal health care utilization in a north indian city. *Demography*. 2001;38(1):67-78.
39. Adamu YM, Salihu HM. Barriers to the use of antenatal and obstetric care services in rural kano, nigeria. *J Obstet Gynaecol*. 2002;22(6):600-603.
40. Gleib DA, Goldmanb N, Rodriguezb G. Utilization of care during pregnancy in rural guatemala: Does obstetrical need matter? *Soc Sci Med*. 2003;57(12):2447-2463.
41. Griffiths P, Stephenson R. Understanding user's perspectives of barriers to maternal health care use in maharashtra, india. *Journal of Biosocial Science*. 2001;33(3):339-359.
42. Jimoh AAG. Utilisation of antenatal services at the provincial hospital, mongomo, guinea equatoria. *African Journal of Reproductive Health*. 2003;7(3):49-54.
43. Mathole T, Lindmark G, Majoko F, Ahlberg BM. A qualitative study of women's perspectives of antenatal care in a rural area of zimbabwe. *Midwifery*. 2004;20(2):122-132.
44. Mekonnen Y, Mekonnen A. Factors influencing the use of maternal healthcare services in ethiopia. *Journal of health, population, and nutrition*. 2003;21(4):374-382.
45. McCaw-Binns A, La Grenade J, Ashley D. Under-users of antenatal care: A comparison of non-attenders and late attenders for antenatal care, with early attenders. *Soc Sci Med*. 1995;40(7):1003-1012.

46. Mumtaz Z, Salway S. 'I never go anywhere': Extricating the links between women's mobility and uptake of reproductive health services in Pakistan. *Soc Sci Med*. 2005;60:1751-1765.

47. Simkhada B, van Teijlingen ER, Porter M, Simkhada P. Factors affecting the utilization of antenatal care in developing countries: Systematic review of the literature. *Journal of Advanced Nursing*. 2008;61(3):244-260.

48. Thaddeus S, Maine D. Too far to walk: Maternal mortality in context. *Soc Sci Med*. 1994;38(8):1091-1110.

49. *Compliance in health care*. ; 1979.

50. Becker MH, Maiman LA, Kirscht JP, Haefner DP, Drachman RH, Taylor DW. Patient perceptions and compliance: Recent studies of the health belief model. In: Haynes RB, Taylor DW, Sackett DL, eds. *Compliance in health care*. 1st ed. ; 1979:78-109.

51. Dunbar JM, Stunkard AJ. Adherence to diet and drug regimen. In: Levy R, Rifkind B, Dennis Bea, eds. *Nutrition, lipids and coronary heart disease*. New York: Raven Press; 1979:391-423.

52. Vermeire E, Hearnshaw H, Van Royen P, Denekens J. Patient adherence to treatment: Three decades of research. A comprehensive review. *Journal of Clinical Pharmacy and Therapeutics*. 2001;26:331-342.

53. Becker MH, Maiman LA. Strategies for enhancing patient compliance. *J Community Health*. 1980;6:113.

54. Eraker SA, Kirscht JP, Becker MH. Understanding and improving patient compliance. *Annals of Internal Medicine*. 1984;100:258-268.
55. Burke LE. Compliance with cardiovascular disease prevention strategies. *Annals of behavioral medicine*. 1997;19(3):239-263.
56. Fappa E, Yannakoulia M, Pitsavos C, Skoumas I, Valourdou S, Stefanadis C. Lifestyle intervention in the management of metabolic syndrome: Could we improve adherence issues? *Nutrition*. 2008;24:286-291.
57. Griffith S. A review of the factors associated with patient compliance and the taking of prescribed medicines. *British Journal of General Practice*. 1990;40:114-116.
58. Paschal AM, Hawley SR, St. Romain T, Ablah E. Measures of adherence to epilepsy treatment: Review of present practices and recommendations for future directions. *Epilepsia*, 49(7):1115–1122, 2008. 2008;49(7):1115-1122.
59. Greene JA. 2002 roy porter memorial prize essay therapeutic infidelities: 'Noncompliance' enters the medical literature, 1955-1975. *Social History of Medicine*. 2004;17(3):327-343.
60. Epstein LH, Masek BJ. Behavioral control of medicine compliance. *Journal of Applied Behavior Analysis*. 1978;11(1):1-9.
61. Becker MH. Patient adherence to prescribed therapies. *Medical Care*. 1985;23(5):539-555.

62. Schmid TL, Jeffery RW, Onstad L, Corrigan SA. Demographic, knowledge, physiological, and behavioral variables as predictors of compliance with dietary treatment goals in hypertension. *Addictive Behaviors*. 1991;16:151-160.
63. Kushner RF. Long-term compliance with a lipid-lowering diet. *Nutrition Reviews*. 1993;51(1):16-23.
64. Donovan JL, Blake DR. Patient non-compliance deviance or reasoned decision-making? *Soc Sci Med*. 1992;34(5):507-513.
65. Donovan JL. Patient decision making. the missing ingredient in compliance research. *International Journal of Technology Assessment in Health Care*. 1995;11:443-445.
66. Abou-Zahr C. Non-compliance: A major problem in anaemia control. *Essential Drugs Monitor*. 1990:16.
67. Galloway R, McGuire J. Determinants of compliance with iron supplementation: Supplies, side effects, or psychology? *Soc Sci Med*. 1994;39(3):381-390.
68. Morrow O. Iron supplementation during pregnancy: Why aren't women complying? A review of available information. . 1990;90:5.
69. Kardjati S, Kusin JA, Schofield WM, de With C. Energy supplementation in the last trimester of pregnancy in east java, indonesia: Effect on maternal anthropometry. *Am J Clin Nutr*. 1990;52:987-994.

70. Galloway R, Duschb E, Elderc L, et al. Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries. *Social Science & Medicine*. 2002;55:529-544.

71. Mumtaz Z, Shahab S, Butt N, Rab MA, DeMuynck A. Daily iron supplementation is more effective than twice weekly iron supplementation in pregnant women in pakistan in a randomized double-blind clinical trial. *J Nutr*. 2000;130:2697-2702.

72. Mukhopadhyay A, Bhatla N, Kriplani A, Pandey RM, Saxena R. Daily versus intermittent iron supplementation in pregnant women: Hematological and pregnancy outcome. *J Obstet Gynaecol Res*. 2004;30(6):409-417.

73. Johnson CS. *The role of participation with nutritional supplementation during pregnancy: A comparison of data from indonesia and guatemala*. Cornell University; 1991.

74. Daniel EM, Kasprzyk D. The theory of reasoned action and the theory of planned behavior. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education*. 3rd edition ed. San Francisco: Jossey-Bass A Wiley Imprint; 2002:67-98.

75. Godin G, Kok G. The theory of planned behavior: A review of its applications to health-related behaviors. *Am J Health Promot*. 1996;11(2):87-98.

76. Harrison JA, Mullen PD, Green LW. A meta-analysis of studies of the health belief model with adults. *Health Education Research*. 1992;7(1):107-116.

77. Janz NK, Champion VL, Strecher GJ. The health belief model. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education, theory, research, and practice*. 3rd ed. San Francisco: John Wiley & Sons, Inc.; 2002:45-66.
78. Rosenstock IM. Historical origins of the health belief model. *Health Education Monographs*. 1974;2(4):328-335.
79. Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior*. New Jersey: Prentice-Hall; 1980.
80. Steckler A, McLeroy KR, Goodman RM, Bird ST, McCormick L. Toward integrating qualitative and quantitative methods: An introduction. *Health Education & Behavior*. 1992;19(1):1-8.
81. Mayberry LJ, Affonso DD, Shibuya J, Clemmens D. Integrating cultural values, beliefs, and customs into pregnancy and postpartum care: Lessons learned from a hawaiian public health project. *J Perinat Neonat Nurs*. 1999;13(1):15-26.
82. Kennedy HP. A model of exemplary midwifery practice: Results of a delphi study. *Journal of Midwifery & Women's Health*. 2000;45(1):4-19.
83. Erci B. Barriers to utilization of prenatal care services in turkey. *Health Policy and Systems*. 2003;35(3):269-273.
84. Matsumura M, Gubhaju B. Women's status househld structure and the utilization of maternal health services in nepal. *Asia-Pacific Population Journal*. 2001;16(1):23-44.

85. Gryboski KL. The importance of qualitative methods for field-based nutritional research. *Am J Clin Nutr.* 1995;62:153-154.
86. Katona-Apte J. The socio-cultural aspects of food avoidance in a low-income population in tamilnad, south india. *Environmental Child Health.* 1977:83-90.
87. Amin R, Khan AH. Characteristics of traditional midwives and their beliefs and practices in rural bangladesh. *International Journal of Gynecology and Obstetrics.* 1989;28:119-125.
88. Christian P, Srihari SB, Thorne-Lyman A, Khatry SK, LeClerq SC, Shrestha SR. Eating down in pregnancy: Exploring food-related beliefs and practices of pregnancy in rural nepal. *Ecology of Food and Nutrition.* 2006;45:253-278.
89. Laderman C. Destructive health cooling prayer: Malay humoralism in pregnancy, childbirth and the postpartum period. *Soc Sci Med.* ;25(4):357-365.
90. Pelto G. Cultural issues in maternal and child health and nutrition. *Social Science and Medicine.* 1987;25(6):553-559.
91. Davis-Floyd RE, Georges E. Pregnancy. In: Levinson D, Ember M, eds. *Encyclopedia of cultural anthropology.* ; 1996:1014-1015.
92. Bhatia S. Traditional childbirth practices: Implications for a rural MCH program. *Stud Fam Plan.* 1987;12(2):66-75.



93. Nag M. Beliefs and practices about food during pregnancy. *Econ Political Wkly*. 1994;2427-2438.
94. Nichter M, Nichter M. The ethnophysiology and folk dietetics of pregnancy.' A case study from south india. *Human Organization*. 1983;42(3):235-246.
95. Laderman C. Destructive heat and cooling prayer: Malay humoralism in pregnancy, childbirth and the postpartum period. *Soc Sci Med*. 1987;25(4):357-365.
96. Ojofeitimi EO, Elegbe I, Babafemi J. Diet restriction by pregnant women in nigeria. *International Journal of Gynaecology and Obstetrics*. 1982;20(2):99-103.
97. Pool R. Hot and cold as an explanatory model: The example of bharuch district in gujarat, india. *Soc Sci Med*. 1987;25(4):389-399.
98. Ghanekar J, Kanani S, Patel S. Toward better compliance with iron–folic acid supplements: Understanding the behavior of poor urban pregnant women through ethnographic decision models in vadodara, india. *Food and Nutrition Bulletin*. 2002;23(1):65-71.
99. Al-Darazi FA. Bahraini wome's health practices. *Journal of Tropical Pediatrics*. 1987;33(Suppl.4):14-15.
100. Suitor CW, Gardner JD. Supplement use among a culturally diverse group of low-income pregnant women. *Journal of the American Dietetic Association*. 1990;90(2):268-271.
101. Winichagoon P. Prevention and control of anemia: Thailand experiences. *J Nutr*. 2002;132:862S-866S.

102. Gross R, Schultink W, Gross U. Reply to KL gryboski (letter to the editor). *Am J Clin Nutr.* 1995;62:154-155.
103. Thompson JJ, Nichter M. The compliance paradox: What we need to know about "real-world" dietary supplement use in the united states. *Altern Ther Health Med.* 2007;13(2):48-55.
104. Young SL, Ali SM. Linking traditional treatments of maternal anaemia to iron supplement use: An ethnographic case study from pemba island, zanzibar. *Maternal and Child Nutrition.* 2005;1:51-58.
105. Phuc TQ, Mhrshahi S, Casey GJ, Phu L, B.A. Lessons learned from implementation of a demonstration program to reduce the burden of anemia and hookworm in women in yen bai province, viet nam. *BMC Public Health.* 2009;9:266-275.
106. Huybregts L, Roberfroid D, Lanou H, et al. Prenatal food supplementation fortified with multiple micronutrients increases birth length: A randomized controlled trial in rural burkina faso. *The American Journal of Clinical Nutrition.* 2009;90:1593-1600.
107. Persson LÅ, Arifeen S, Ekström EC, et al. Effects of prenatal micronutrient and early food supplementation on maternal hemoglobin, birth weight, and infant mortality among children in bangladesh. *JAMA.* 2012;307(19):2050-2059.
108. Nahar S, Mascie-Taylor CGN, Begum HA. Impact of targeted food supplementation on pregnancy weight gain and birth weight in rural bangladesh: An assessment of the bangladesh integrated nutrition program (BINP). *Public Health Nutrition.* 2009;12(8):1205-1212.

109. Olson RK. *Developing indicators that predict benefit from prenatal energy supplementation*. Ithaca, NY: Cornell University; 1994.
110. UNICEF, UNU, WHO. *Iron deficiency anaemia: Assessment, prevention and control A guide for programme managers*. World Health Organization; 2001.
111. Blum LS, Nahar P. Eating down: The social construction of a safe delivery in bangladesh. . 2005.
112. Johnson RB, Onwuegbuzie AJ. Mixed methods research: A research paradigm whose time has come. *Educational researcher*. 2004;33:14-26.
113. Harris JE, Gleason PM, Sheean PM, Boushey C, Beto JA, Bruemmer B. An introduction to qualitative research for food and nutrition professionals. *Journal of the American Dietetic Association*. 2009;109:80-90.
114. Greene JC, Caracelli VJ, Graham WF. Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*. 1989;11(3):255-274.
115. Pelto PJ, Pelto GH. *Anthropological research: The structure of inquiry*. 2nd ed. Cambridge, UK: Cambridge University Press; 1978.
116. Pike KL. *Language in relation to a unified theory of the structure of human behavior*. 1st ed. Dallas, US: Summer Institute of Linguistics; 1954.
117. Spradely JP. *The ethnographic interview*. Holt, Rinehart and Winston, Inc.; 1979.

118. ICDDR B. MINIMat: A report to UNICEF on the effect on birth weight and maternal haemoglobin of combined interventions in pregnant bangladeshi women to promote maternal and infant health. . 2004;Version 3.2.

119. Young SL, Pelto GH. Core concepts in nutritional anthropology. In: Temple NJ, Wilson T, Jacobs J, D.R., eds. *Nutritional health: Strategies for disease prevention*. 3rd ed ed. New York, US: Humana Press; 2012:523-537.

120. Pelto GH, Goodman AH, Dufour DL. The biocultural perspective in nutritional anthropology. In: Goodman AH, Dufour DL, Pelto GH, eds. *Nutritional anthropology: Biocultural perspectives on food and nutrition*. Mayfield Publishing Company; 2000:1-9.

121. Cosminsky S. Midwives and menstrual regulation: A guatemalan case study. In: van de Walle E, Renne EP, eds. *Regulating menstruation, beliefs, practices, interpretations*. ; 2001:254-273.

122. Klitsch M. Preexisting factors, but not logistical barriers, inhibit timely use of prenatal care. *Family Planning Perspectives*. 2000;32(5):262-263.

123. Watkins EL. Low-income negro mothers - their decision to seek prenatal care. *AJPH*. 1968:655-667.

124. Atkinson SJ, Farias MF. Perceptions of risk during pregnancy amongst urban women in northeast brazil. *Soc Sci Med*. 1994;41(11):1577-1586.

125. Manocha S, Manocha AA, Vir D. Cultural beliefs and practices affecting the utilisation of health services during pregnancy. *Journal of Indian Anthropological society*. 1992;27:181-185.
126. Goodburn EA, Gazi R, Chowdhury M. Beliefs and practices regarding delivery and post partum maternal morbidity in rural bangladesh. *Stud Fam Plan*. 1995;26(1):22-32.
127. Hutter I. Reduction of food intake during pregnancy in rural south india. *Trop Med Int Health*. 1996;1(3):399-405.
128. Ferro-Luzi EG. Food avoidances of pregnant women in tamilnad. In: Robson JRK, ed. *Food, ecology and culture: Readings in the anthropology of dietary practices*. New York, US: Gordon and Breach Science Publishers; 1980:101-108.
129. Shannon K, Mahmud Z, Asfia A, Ali M. The social and environmental factors underlying maternal malnutrition in rural bangladesh: Implications for reproductive health and nutrition programs. *Health Care for Women International*. 2008;29:826-840.
130. Matthews Z, Mahendra S, Kilaru A, Ganapathy S. Antenatal care, care-seeking and morbidity in rural karnataka, india: Results of a prospective study. *Asia-Pacific Population Journal*. 2001;16(2):11-28.
131. Piechulek H, Aldana JM, Engelsmann B, Hasan MN. Dietary management during pregnancy, lactation and common childhood illnesses in rural bangladesh. *Southeast Journal of Tropical Medicine and Public Health*. 1999;30(2):299-306.

132. Balk D. Change comes slowly for women in rural bangladesh. *AsiaPacific Population & Policy*. 1997;41:1-4.
133. Koenig MA, Ahmed S, Hossain MB, Mozumder KA. Women's status and domestic violence in rural bangladesh: Individual- and community-level effects. *Demography*. 2003;40(2):269-288.
134. Anderson S, Eswaran M. What determines female autonomy? evidence from bangladesh. *Journal of Development Economics*. 2009;90:179-191.
135. Haque SE, Rahman M, Mostofa G, Zahan S. Reproductive health care utilization among young mothers in bangladesh: Does autonomy matter? *Women's Health Issues (In press)*. 2011.
136. Chowdhury AMR, Mahbub A, Chowdhury AS. Skilled attendance at delivery in bangladesh: An ethnographic study. *Research Monograph Series*. 2003;No. 22.
137. Khan MI, Bhuiya A, Chowdhury M. Cultural construction of health and the institutional measures of change in rural bangladesh: The cases of the BRAC village organization and ICDDR, B MCH-FP programmes in the selected billages of matlab. . 1996;Working Paper Number 14:1-13.
138. Fauveau V, ed. *MATLAB: Women, children and health*. Dhaka: The International Centre for Diarrhoeal Disease Research, Bangladesh; 1994ICDDR, B Special Publication; No. 35.

139. The World Bank Office, Dhaka. The bangladesh integrated nutrition project effectiveness and lessons. . 2005;No.8.
140. Bernard HR. *Research methods in anthropology: Qualitative and quantitative methods*. 3rd ed ed. Walnut Creek, US: AltaMira Press; 2002.
141. Bernard HR, Ryan GW. Text analysis; qualitative and quantitative methods. In: Bernard HR, ed. *Handbook of methods in cultural anthropology*. Lanham, MD: AltaMira Press; 2000:816.
142. Levy RI, Hollan DW. Person-centered interviewing and observation. In: Bernard HR, ed. *Handbook of methods in cultural anthropology*. ; 2000:333-364.
143. Strauss A, Corbin J. *Basics of qualitative research: Grounded theory procedures and techniques*. 1st ed ed. Newbury Park, US: SAGE publications; 1990.
144. Glaser BG, Strauss AL. *The discovery of grounded theory; strategies for qualitative research*. Chicago: Aldine Pub. Co.; 1967.
145. Mumtaza A, Salway S. 'I never go anywhere': Extricating the links between women's mobility and uptake of reproductive health services in pakistan. *Soc Sci Med*. 2005;60(8):1751-1765.
146. Pallikadavath S, Foss M, Stones RW. Antenatal care: Provision and inequality in rural north india. *Soc Sci Med*. 2004;59:1147-1158.

147. Orr RD, Simmons JJ. Nutritional care in pregnancy: The patient's view. *Journal of The American Dietetic Association*. 1979;75:131-136.
148. ICDDR B. MINIMat, A report to UNICEF on the effect on birth weight and maternal haemoglobin of combined interventions in pregnant bangladeshi women to promote maternal and infant health. . 2004.
149. Prentice AM, Cole TJ, Foord FA, Lamb WH, Whitehead RG. Increased birth weight after prenatal dietary supplementation of rural african women. *Am J Clin Nutr*. 1987;46:912-925.
150. Shaheen R, Francisco A, Arifeen SE, Ekstrom E, Persson LA. Effect of prenatal food supplementation on birth weight: An observational study from bangladesh. *The American Journal of Clinical Nutrition*. 2006;83:1355-1361.
151. Ceesay SM, Prentice AM, Cole TJ, et al. Effects on birth weight and perinatal mortality of maternal dietary supplements in rural gambia: 5 year randomised controlled trial. *BMJ*. 1997;315:786-790.
152. Lechtig A, Habicht JP, Delgado H, Klein RE, Yarbrough C, Martorell R. Effect of food supplementation during pregnancy on birthweight. *Pediatrics*. 1975;56(4):508-520.
153. Mora JO, De Navarro L, Clement J, Wagner M, de Paredes B, Herrera MG. The effect of nutritional supplementation on caloric and protein intake of pregnant women. *Nutrition Reports International*. 1978;17(2):217-228.
154. Rush D, Stein Z, Susser M. A randomized controlled trial of prenatal nutritional supplementation in new york city. *Pediatrics*. 1980;65(4):683-697.



155. Friis H, Gomo E, Nyazema N, et al. Effect of multimicronutrient supplementation on gestational length and birth size: A randomized, placebo-controlled, double-blind effectiveness trial in zimbabwe. . 2004;80:178-184.

156. Ramakrishnan U, Gonzalez-Cossio T, Neufeld LM, Rivera J, Martorell R. Multiple micronutrient supplementation during pregnancy does not lead to greater infoant birth size than does iron-only supplementation: A randomized controlled trial in a semirural community in mexico. *Am J Clin Nutr.* 2003;77:720-725.

157. Zeng l, Yan H, Cheng Y, Dang S, Dibley MJ. Adherence and costs of micronutrient supplementation in pregnancy in a double-nlind, randomized, controlled trial in rural western china. *Food and Nutrition Bulletin.* 2009;30(4):S480-S487.

158. Flores ML, Neufeld LM, González-Cossío T, Rivera J, Martorell R, Ramakrishnan U. Multiple micronutrient supplementation and dietary energy intake in pregnant women. *Salud pública de méxico.* 2007;49(3):190-198.

159. Osrin D, Vaidya A, Shrestha Y, et al. Effects of antenatal multiple micronutrient supplementation on birthweight and gestational duration in nepal: Double-blind, randomised controlled trial. *Lancet.* 2005;365:955-962.

160. Ekström E, Hyder SMZ, Chowdhury AMR, et al. Efficacy and trial effectiveness of weekly and daily iron supplementation among pregnant women in rural bangladesh: Disentangling the issues. *The American Journal of Clinical Nutrition.* 2002;76:1392-1400.

161. Myer L, Harrison A. Why do women seek antenatal care late? perspectives from rural south africa. *Journal of Midwifery & Women's Health*. 2003;48:268-272.

162. Hill Z, Kirkwood B, Kendall C, Adjei E, Arthur P, Agyemang CT. Factors that affect the adoption and maintenance of weekly vitamin A supplementation among women in ghana. *Public Health Nutrition*. 2007;10(8):827-833.

163. Islam MA, Nielsen CC. Maternal and child health services: Evaluating mothers' perceptions and participation. *Public Health*. 1993;107:243-249.

164. Betancourt JR. Cultural competency: Providing quality care to diverse population. *The Consultant pharmacist*. 2006;21:988-995.

165. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991;50:179-211.

166. Poss JE. Developing a new model for cross-cultural research: Synthesizing the health belief model and the theory of reasoned action. *Adv Nurs Sci*. 2001;23(4):1-15.

167. Connor M, Armitage CJ. Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Behavior Analysis*. 1998;28(15):1429-1464.

168. Goodman AH, Dufourt DL, Pelto GH. *The biocultural perspective in nutritional anthropology*. Mayfield Publishing Company; 2000.

169. Baric L, Macarthur C. Health norms in pregnancy. *British Journal of Preventive and Social Medicine*. 1977;31:30-38.

170. Carruth BR, Skinner JD. Practitioners beware: Regional differences in beliefs about nutrition during pregnancy. . 1991;91(4):435-440.

171. Kulkarni B, Christian P, LeClerq SC, Khatry SK. Determinants of compliance to antenatal micronutrient supplementation and women's perceptions of supplement use in rural nepal. *Public Health Nutrition*. 2009;13(1):82-90.

172. Villar J, Rivera J. Nutritional supplementation during two consecutive pregnancies and the interim lactation period: Effect on birth weight. *Pediatrics*. 1988;81(1):51-57.

173. Magadi MA, Janet Madise NJ, Rodrigues RN. Frequency and timing of antenatal care in kenya: Explaining the variations between women of different communities. *Social Science & Medicine*. 2000;51(4):551-561.

174. Habicht JP, Yarbrough C, Lechtig A, Klein RE. Relation of maternal supplementaly feeding during pregnancy to birth weight and other sociobiological factors. *Current Concepts in Nutrtrion*. 1974;2:127-145.

175. Balk D. Change comes slowly for women in rural bangladesh. *Asia-Pacific population and policy*. 1997;41(4):1.

176. Sikder SS, Labrique AB, Ullah B, et al. Accounts of severe acute obstetric complications in rural bangladesh. *BMC Pregnancy and Childbirth*. 2011;11:76. doi: 10.1186/1471-2393-11-76.

177. Senarath U, Gunawardena NS. Women's autonomy in decison making for health care in south asia. *Asia-Pacific Journal of Public Health*. 2009;21(2):137-143.

178. Lewin K. Frontiers in group dynamics : II. channels of group life; social planning and action research. *Human Relations*. 1947;1:143-153.
179. Tessema J, Jeffereds ME, Cogswell M, Carlton E. Motivators and barriers to prenatal supplement use among minority women in the united states. *Journal of the American Dietetic Association*. 2009;109:102-108.
180. Schultink W. Iron-supplementation programmes: Compliance of target groups and frequency of tablet intake. *Food and Nutrition Bulletin*. 1996;17(1):6-22.
181. Wilson BM. Promoting compliance: The patient-provider partnership. *Advances in Renal Replacement Therapy*. 1995;2(3):199-206.
182. Krummel DA, Humphries D, Tessaro I. Focus groups on cardiovascular health in rural women: Implications for practice. *J Nutr Educ Behav*. 2002;34(1):38-46.
183. Gross U, Diaz MM, Valle C. Effectiveness of the communication program on compliance in a weekly multimicronutrient supplementation program in Chiclayo, Peru. *Food and Nutrition Bulletin*. 2006;27(4(supplement)):S130-S142.
184. Young SL, Blanco I, Hernandez-Cordero S, Pelto GH, Neufeld LM. Organoleptic properties, ease of use, and perceived health effects are determinants of acceptability of micronutrient supplements among poor Mexican women. *Journal of Nutrition*. 2010;140:605-61.
185. Pelto GH, Jerome NW. An anthropological perspective on nutrition program evaluation. In: Santos W, Lopres H, Barbosa JJ, Chaves D, eds. *Nutrition and food science vol. 2*. Plenum Publishing Corporation; 1980:553-571.

186. Peltó PJ, Peltó GH. Intra-cultural diversity: Some theoretical issues. *American Ethnologist*. 1975;2(1):1-18.
187. Joosopó J, Abu J, Yu SL. A survey of fasting during pregnancy. *Singapore Medical Journal*. 2004;45(12):583-586.
188. Kridli SAO. Health beliefs and practices of muslim women during ramadan. *MCN, The American Journal of Maternal/Child Nursing*. 2011;36(4):216-221.
189. Robinson T, Raisler J. "Each one is a doctor for herself": Ramadan fasting among pregnant muslim women in the united states. *Ethnicity & disease*. 2005;15(1 suppl 1):s1-99-s1-103.
190. Bandura A. Social cognitive theory. *Annals of child development*. 1989;6:1-60.
191. Deci EL, Eghrarl H, Patrick BC, Leone DR. Facilitating internalization: The self-determination theory perspective. *Journal of Personality*. 1994;62(1):119-142.
192. Becker MH, Drachman RH, Kirscht JP. A new approach to explaining sick-role behavior in low-income populations. *American Journal of Public Health*. 1974;64(3):205-216.
193. Bandura A. Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*. 1991;50:248-287.
194. Bandura A. *Social foundations of thought and action : A social cognitive theory*. Englewood Cliffs, N.J: Prentice-Hall,; 1986.

195. Bandura A. Self efficacy: Toward a unifying theory of behavioral change. *Psychological Review*. 1977;84:191-215.
196. Becker MH, Haefner DP, Kasl SV, Kirscht JP, Maiman LA, Rosenstock IM. Selected psychosocial models and correlates of individual health-related behaviors. *Medical Care*. 1977;15(5(supple)):27-46.
197. Pajares F. Overview of social cognitive theory and of self-efficacy. <http://www.emory.edu/EDUCATION/mfp/eff.html>. Updated 2002. Accessed June 19, 2014.
198. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*. 2000;55(1):68-78.
199. DeVries H, Dijkstra M, Kuhlman P. Self-efficacy: The third factor besides attitude and subjective norm as a predictor of behavioral intentions. *Health Educ Res*. 1988;3:273-282.
200. Amooti-Kaguna B, Nuwaha F. Factors influencing choice of delivery sites in rakai district of uganda. *Social Science & Medicine*. 2000;50:203-213.
201. Strecher VJ, DeVellis BM, Becker MH, Rosenstock IM. The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*. 1986;13(1):73-91.
202. Anderson ES, Winett RA, Wojcik JR. Self-regulation, self-efficacy, outcome expectations, and social support: Social cognitive theory and nutrition behavior. *Ann Behav Med*. 2007;34(3):304-312.

203. Conner M, Armitage CJ. Dietary change. In: *The social psychology of food*. Buckingham, PA: Open University Press; 2002:43-73.
204. Armitage CJ, Conner M. Social cognition models and health behavior: A structured review. *Psychology and Health*. 2000;15:173-189.
205. Bandura A. *Social learning theory*. New York: General Learning Press; 1977.
206. Bailey RL, West Jr. KP, Black RE. The epidemiology of global micronutrient deficiencies. *Ann Nutr Metab*. 2015;66((suppl 2)):22-33.
207. Zavaleta N, Caulfield LC, Figueroa A, Chen P. Patterns of compliance with prenatal iron supplementation among peruvian women. *Maternal and Child Nutrition*. 2014;10:198-205.
208. Gross U, Valle C, Diaz MM. Effectiveness of distribution of multimicronutrient supplements in children and in women and adolescent girls of childbearing age in Chiclayo, Peru. *Food and Nutrition Bulletin*, vol. 27, no. 4 (supplement) © 2006,. 2006;27(4(supplement)):S122-S129.
209. Smitasiri S, Solon FS. Implementing preventive iron-folic acid supplementation among women of reproductive age in some western Pacific countries: Possibilities and challenges. *Nutrition Reviews*. 2005;63(12):s81-s86.
210. Nagata JM, Gatti LR, Barg FK. Social determinants of iron supplementation among women of reproductive age: A systematic review of qualitative data. *Maternal and Child Nutrition*. 2012;8:1-18.

211. Ugwu EO, Olibe AO, Obi SN, Ugwu AO. Determinants of compliance to iron supplementation among pregnant women in enugu, southeastern nigeria. *Nigerian Journal of Clinical Practice*. 2014;17(5):608-612.
212. Habib F, Alabdin EHZ, Alenazy M, Nooh R. Compliance to iron supplementation during pregnancy. *Journal of Obstetrics and Gynaecology*. 2009;29(6):487-492.
213. Chowdhury ME, Ahmed A, Kalim N, Koblinsky M. Causes of maternal mortality decline in matlab, bangladesh. *Journal of Health Population and Nutrition*. 2009;27(2):108-123.
214. Japan Bank for International Cooperation. Bangladesh education sector overview. . 2002.
215. Schuler SR, Hashemi SM. Credit programs, women's empowerment, and contraceptive use in rural bangladesh. *Stud Fam Plann*. 1994;25(2):65-76.
216. Nanda P. Women's participation in rural credit programmes in bangladesh and their demand for formal health care: Is there a positive impact? *Health Econ*. 1999;8(5):415-428.
217. Chowdhury A. Changes in maternal nutritional status in a chronically malnourished population in rural bangladesh. *Ecology of Food and Nutrition*. 1987;19:201-211.
218. Tetens I, Hels O, Khan NI, Thilsted SH, Hassan N. Rice-based diets in rural bangladesh: How do different age and sex groups adapt to seasonal changes in energy intake? *The American Journal of Clinical Nutrition*. 2003;78:406-413.



219. Huffman SL, Wolff M, Lowell S. Nutrition and fertility in bangladesh: Nutritional status of nonpregnant women. *The American Journal of Clinical Nutrition*. 1985;42(4):725-738.
220. Brown KH, Black RE, Robertson AD, Becker S. Effects of season and illness on the dietary intake of weanlings during longitudinal studies in rural bangladesh. *The American Journal of Clinical Nutrition*. 1985;41(2):343-355.
221. Holm S. A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*. 1979;6(2):65-70.
222. Mithra P, Unnikrishnan B, Rekha T, et al. Compliance with iron-folic acid (IFA) therapy among pregnant women in an urban area of south india. *African Health Sciences*. 2013;13(4):880-885.
223. WHO. Guideline: Daily iron and folic acid supplementation in pregnant women. . 2012.
224. Reveiz L, Gyte GML, Cuervo LG, Casasbuenas A. **Treatments for iron-deficiency anaemia in pregnancy.** *Cochrane Database Syst Rev*. 2011;10(CD003094).
225. Ashorn P, Alho L, Ashorn U, et al. The impact of lipid-based nutrient supplement provision to pregnant women on newborn size in rural malawi: A randomized controlled trial. *Am J Clin Nutr*. 2015;101:387-397.
226. Adair LS, Pollitt E. **Outcome of maternal nutritional supplementation: A comprehensive review of the bacon chow study.** *The American Journal of Clinical Nutrition*. 1985;41(5):948-978.

227. Durnin JV. Energy requirements of pregnancy: An integration of the longitudinal data from the five-country study. *Lancet*. 1987;Nov14;2(8568):1131-1133.
228. Prentice AM, Goldberg GR. Energy adaptations in human pregnancy: Limits and long-term consequences. *The American Journal of Clinical Nutrition*. 2000;71((suppl)):1226s-1232s.
229. FAO/WHO/UNU Expert Consultation. Food and nutrition technical report series: Human energy requirements. . 2001;1.
230. Institute of Medicine Committee on Nutritional Status During Pregnancy and Lactation. Nutrition during pregnancy. . 1990.
231. Lacerte P, Pradipasen M, Temcharoen P, Iamee N, Vorapongsathorn T. Determinants of adherence to iron/folate supplementation during pregnancy in two provinces in cambodia. *Asia-Pacific Journal of Public Health*. 2011;23(3):315-323.
232. Titaley CR, Dibley MJ. Factors associated with not using antenatal iron/folic acid supplements in indonesia: The 2002/2003 and 2007 indonesia demographic and health survey. *Asia Pac J Clin Nutr*. 2015;24(1):162-176.
233. Woo JS. *Factors affecting pregnant women's participation in a nutrition supplementation program in bangladesh*. Cornell University; 2016.
234. Aronsson CA, Vehik K, Yang J, et al. Use of dietary supplements in pregnant women in relation to sociodemographic factors – a report from the environmental determinants of diabetes in the young (TEDDY) study. *Public Health Nutrition*. 2013;16(8):1390-1402.

235. Kanak K, Busch-Hallen J, Cavalli-Sforza T, Crape B, Smitasiri S, Cambodian Weekly Iron-Folic Acid Program Team. Weekly iron-folic acid supplements to prevent anemia among cambodian women in three settings: Process and outcomes of social marketing and community mobilization. *Nutrition Reviews*. 2005;63(12):s126-s133.
236. Katz J, West KP, Wu L, et al. Determinants of maternal vitamin A or beta-carotene supplementation coverage: Village-based female distributors in nepal. *American Journal of Public Health*. 2002;92(7):1105-1107.
237. Ogundipe O, Hoyo C, O stbye T, et al. Factors associated with prenatal folic acid and iron supplementation among 21,889 pregnant women in northern tanzania: A cross-sectional hospital-based study. *BMC Public Health*. 2012;12:481-491.
238. Pouchieu C, Le´vy R, Faure C, et al. Socioeconomic, lifestyle and dietary factors associated with dietary supplement use during pregnancy. *PLoS ONE*. 2013;8(8):1-9.
239. Gebremedhin S, Samuel A, Mamo G, Moges T, Assefa T. Coverage, compliance and factors associated with utilization of iron supplementation during pregnancy in eight rural districts of ethiopia: A cross-sectional study. *BMC Public Health*. 2014;14:607-624.
240. Hyder SMZ, Persson LA, Chowdhury AMR, Ekström E. Do side-effects reduce compliance to iron supplementation? A study of daily- and weekly-dose regimens in pregnancy. *J Health Popul Nutr*. 2002;20(2):175-179.
241. Von-Ah D, Ebert S, Ngamvitroj A, Park N, Kang DH. Predictors of health behaviours in college students. *J Adv Nurs*. 2004;48(5):463-474.

242. Weitkunat R, Pottgiesser C, Meyer N, et al. Perceived risk of bovine spongiform encephalopathy and dietary behavior. *J Health Psychol.* 2003;8(3):373-381.
243. Rosenstock IM. Why people use health services. *The Milbank Memorial Fund Quarterly.* 1966;44(3):94-127.
244. Pappagallo S, Bull DL. Operational problems of an iron supplementation programme for pregnant women: An assessment of UNRWA experience. *Bulletin of World Health Organization.* 1998;74(1):25-33.
245. Taye B, Abeje G, Mekonen A. Factors associated with compliance of prenatal iron folate supplementation among women in mecha district, western amhara: A cross-sectional study. *PanAfrican Medical Journal.* 2015;20(43):1-7.
246. Popa AD, Nita O, Graur LI, et al. Nutritional knowledge as a determinant of vitamin and mineral supplementation during pregnancy. *BMC Public Health.* 2013;13:1105-1125.
247. Ejidokun OO. Community attitudes to pregnancy, anaemia, iron and folate supplementation in urban and rural lagos, south-western nigeria. *Midwifery.* 2000;16:89-95.
248. Seisa PM. "Women come here on their own when they need to": Prenatal care, authoritative knowledge, and maternal health in oaxaca. *Medical Anthropology Quarterly.* 1996;10(2):121-140.
249. Alhusen JL, Ray E, Sharps P, Bullock L. Intimate partner violence during pregnancy: Maternal and neonatal outcomes. *Journal of Women's Health.* 2015;24(1):100-106.

250. Henriksen L, Schei B, Vangen S, Lukasse M. Sexual violence and neonatal outcomes: A norwegian population-based cohort study. *BMJ*. 2014;4:e005935.
251. Sukchan P, Liabsuetrakul T, Chongsuvivatwong V, Songwathana P, Sornsrivichai V, Kuning M. Inadequacy of nutrients intake among pregnant women in the deep south of thailand. *BMC Public Health*. 2010;10:572-579.
252. Moraes CL, Amorim AR, Reichenheim ME. Gestational weight gain differentials in the presence of intimate partner violence. *International Journal of Gynecology and Obstetrics*. 2006;95:254-260.
253. Abdullahi H, Gasim GI, Ahmed Saeed A, Imam AM, Adam I. Antenatal iron and folic acid supplementation use by pregnant women in khartoum, sudan. *BMC Research Notes*. 2014;7:498-501.
254. Prentice AM, Roberts SB, Prentice A, et al. Dietary supplementation of lactating gambian women. I. effect on breast-milk volume and quality. *Hum Nutr Clin Nutr*. 1983;37(1):53-64.